IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication NOVEMBER 24, 1960

★ U. S. Steel's Meneilly Plans

The Battle for The Metal Can Market p. 51

Strategic Stockpile Studied p. 54
Design for Explosive Forming p. 85
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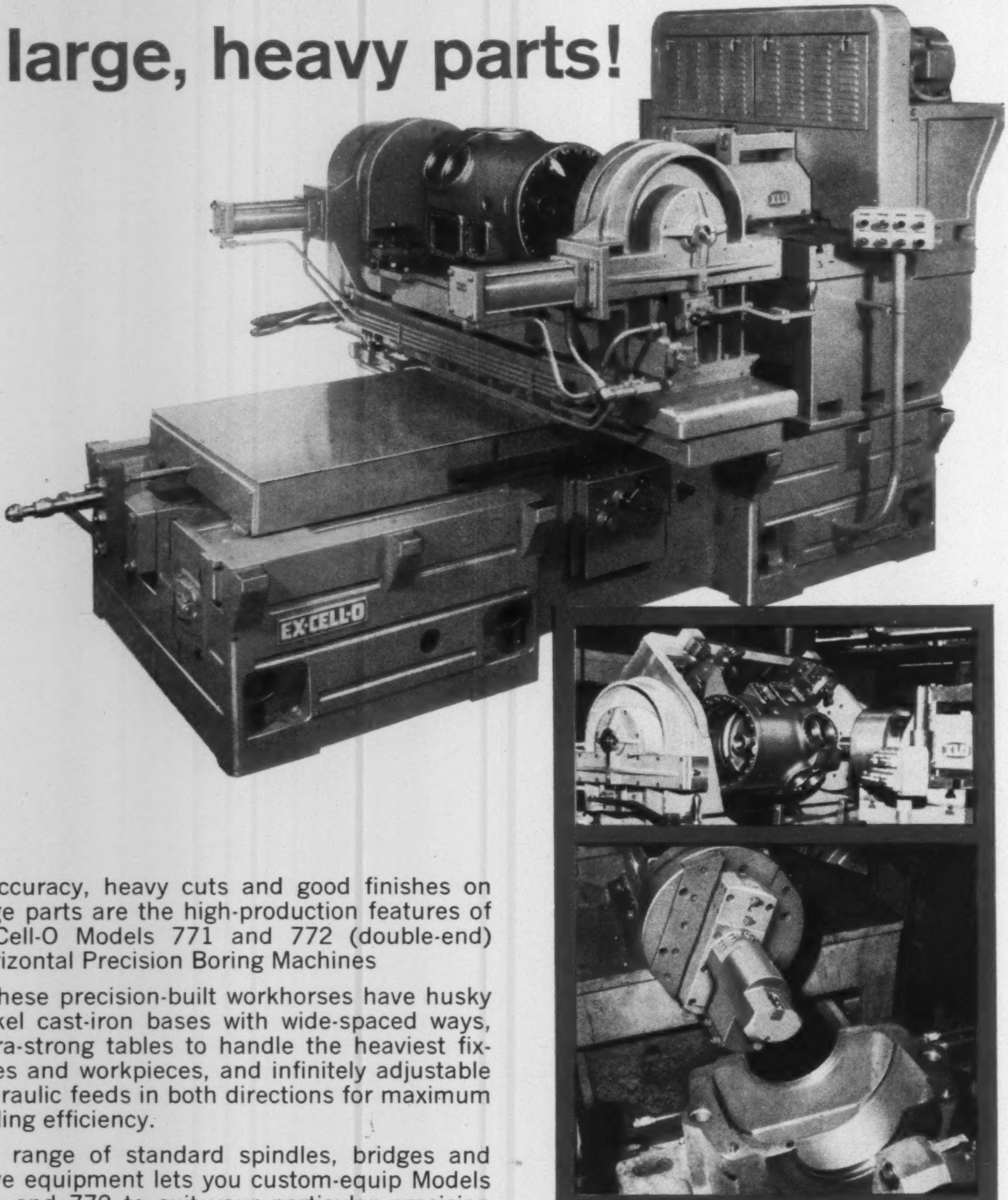

- Accuracy, heavy cuts and good finishes on large parts are the high-production features of Ex-Cell-O Models 771 and 772 (double-end) Horizontal Precision Boring Machines
- These precision-built workhorses have husky nickel cast-iron bases with wide-spaced ways, extra-strong tables to handle the heaviest fixtures and workpieces, and infinitely adjustable hydraulic feeds in both directions for maximum cycling efficiency.
- A range of standard spindles, bridges and drive equipment lets you custom-equip Models 771 and 772 to suit your particular precision boring, turning, facing, grooving and chamfering operations.

Contact your Ex-Cell-O Representative or write direct for details.

Typical of parts handled by Models 771 and 772 are large air conditioning compressor housing castings (main illustration and close-up above), and cast-iron pillow block bearing support housings (bottom photo). Machine takes ⅝" cut as it roughs, finish-bores, and generates interior form of support housing in a single cycle.

60-25

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Machinery Division

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KNOW YOUR ALLOY STEELS . . .

This is one of a series of advertisements dealing with basic facts about alloy steels. Though much of the information is elementary, we believe it will be of interest to many who may find it useful to review fundamentals from time to time.

Methods of Carburizing Alloy Steels

Carburizing is a means of impregnating the surface of steel with carbon, usually to very limited depths. Its purpose is to provide a hard, wear-resisting "case," or outer shell. Alloy steels, correctly handled, can be case-hardened without sacrificing desirable core properties.

There are three types of carburizing in general use:

Liquid Carburizing—The medium here is a hot-salt bath composed basically of cyanide compounds. The steel is immersed in the bath, the period of immersion depending upon the analysis of the steel and the depth of case desired. Liquid carburizing is a convenient method of producing thin, hard, wear-resisting cases, generally within the depth range of 0.02 to 0.03 in. However, deeper cases may be obtained, the actual depths depending upon economics and end uses.

Gas Carburizing — This method employs a furnace in which a carbonaceous atmosphere is created; i.e., gases that are high in carbon components, or those containing carbon. Steel subjected to gas carburizing can be case-hardened to depths generally ranging from 0.01 to 0.04 in. When quenching takes place immediately after carburizing, distortion can be kept to a minimum.

Pack Carburizing — Where the pack method is used, the parts to be carburized are buried in a container of dry carbonaceous materials. The container is sealed tight to prevent the infiltration of air, placed in a furnace and kept there for eight hours or more, the actual time depending upon the depth of case desired. Pack carburizing is particularly suitable where a deep case is essential (0.06 in. and over), although medium cases in the 0.04-to-0.06-in. range are possible.

This series of alloy steel advertisements is now available as a compact booklet, "Quick Facts about Alloy Steels." If you would like a free copy, please address your request to Publications Department, Bethlehem Steel Company, Bethlehem, Pa.

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The IRON AGE

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STOCKPILING

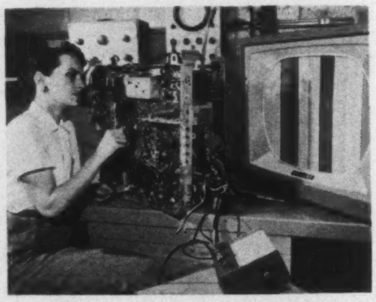
A New Study—The Office of Civil and Defense Mobilization is about to undertake another study "assessing stockpile needs of industrial items for post-attack purposes." P. 54

UNDERGROUND STORAGE

Eliminates Need for Tanks—About 400 ft below the surface, Sun Oil has carved out a cave to store propane. It's one of many man-made caverns which refiners are using instead of above-ground storage. P. 55

CONSUMER ELECTRONICS

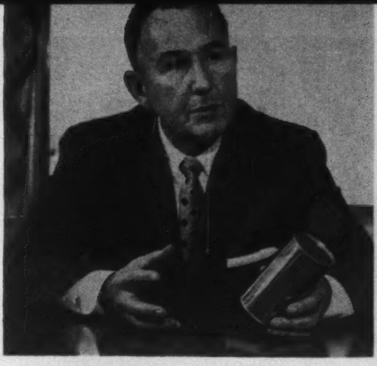
Battle Looms—U. S. makers of consumer electronics say they are prepared to battle foreign competition for the U. S. markets. Foreign producers have made big inroads and U. S. makers admit they have a battle on their hands. P. 57



IRON ORE

Stocks Are High — Lake ship-

Metalworking



Cover Feature

METAL CANS—U. S. Steel's R. M. Meneilly is in the front line in the battle for the metal can market. The coming challenger: Aluminum. This week's Special Report analyzes the strategy of both metals, problems, and probable moves. P. 51

ments of iron ore were cut back sharply after a fast start last spring. However, stocks are high in relation to steel output. P. 58

AUTOMOTIVE

Corvette's Success — Last year Chevrolet reached capacity production with its Corvette sports car. Boosting output would call for compromises the automaker doesn't want to make. One would be replacing the fibreglass body with steel. P. 65

Engineering-Production Developments

EXPLOSIVE FORMING

Gains Ground — An explosive charge can replace both the forging press and the male die. It can also speed prototype and final-run fabrication while reducing research costs. Explosives may be the answer to your cladding, forming, cutting and trimming problems. They'll save on annealing, too. P. 85

PRECISION BEARINGS

For Future Missiles—The world's cleanest white room was built to handle prototypes of the inertial guidance bearings for future missiles. Workers are dressed from head to toe in white nylon. Discoloration tests reveal that the filtration system in the room is 99.9 pct efficient. P. 88

THREADED TUBING

A New Design—The oil country, for one, will welcome buttress-threaded tubing. This new design eliminates internal and external upsetting, while offering higher joint tensile strengths. Tube and couplings can now be slabbed together by normal drop impacts. P. 90

PRODUCT PLANNING

Step-by-Step—Before you even think of planning a new product, many factors must be taken into consideration. These factors reflect the overall corporate strategy and function. Ignore these controls and you invite risk. P. 92

MULTI-ARC WELDING

Proven Economy—Close to 100 companies are using the multi-arc welding system. Its economy and flexibility point up the reasons for its popularity. If your payroll is heavy with welders, it's worth looking into. P. 96

Market and Price Trends

OUTLOOK FOR STEEL

Not Too Bad—A steel executive says 1961 will at least equal this year which will be the industry's sixth best. However, prices "must" go up. P. 53

WEST COAST

Who's Better—West Coast engineers warn that the U. S. must step up its tempo and efficiency if it wants to stay ahead of the Russians in production. P. 67

MACHINE TOOL

Diecasting Outlook—During recent meeting, Die Casting Engineers took a look at what's ahead for the industry. P. 69

STEEL SUMMARY

Automotive Cutbacks — Latest reports from Detroit list delays in automotive steel ordering. They will be a factor in depressing the December market to probably the lowest point in the entire year. P. 119

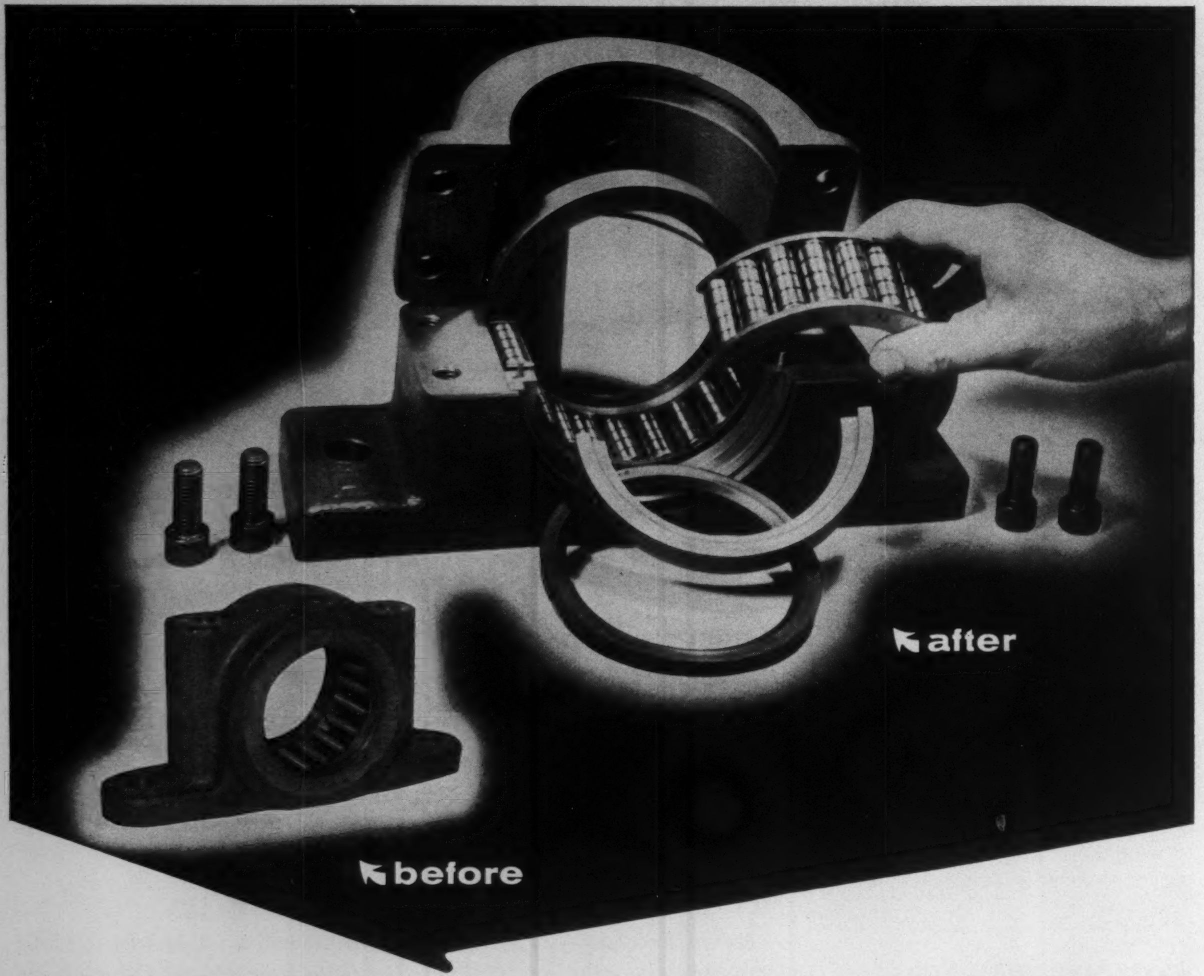
PURCHASING

Low Point—Bearings makers are hoping sales have at last reached a low point and that an upswing will follow. The industry doesn't expect to have as good a year in 1960 as it did in 1959. P. 120

NEXT WEEK

GOALS FOR AMERICANS

What's Ahead—President Eisenhower's Commission on National Goals will soon make its report. In this feature you'll find out its proposals on national growth, technological change and export policy.



Here's a "before" and "after" bearing problem solved by Bearings, Inc.

A large steel mill customer has six cranes with bridge line shafts equipped with the solid housing pillow blocks shown in the "before" photograph. Whenever one of the line shaft bearings needed to be replaced, the entire section of shaft had to be removed. Maintenance costs and crane downtime were excessive and costly. Our engineers were asked for a solution.

THE PROBLEM: Due to the extremely low base to center of shaft dimension of the original bearing, a conventional split housing, split roller bearing pillow block could not be used.

THE ANSWER: We designed and furnished a special split housing pillow block (see "after" photo) incorporating split bearings and split seals which maintain the original dimensions. These can be installed or replaced on the crane in a fraction of the time formerly required just to dismantle the line shaft.

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National Unity: It's Well on Its Way

Thanks to leadership qualities of President-elect Kennedy and Vice President Nixon, campaign breaches are being healed rapidly.

At no time in our nation's history has national unity been such a necessity. At no time in our history have "uncommon" moves by both parties been so needed to shore up our national effort.

There will be cries from both camps that this is no time for bi-partisanship. Or, we also will hear that this is the time to have a one-party approach to our problems.

Neither of these extremes makes sense. But business should not continue as usual—either at home or in our relations abroad.

Senator Kennedy made a gracious but strong approach to bring the people together in national purpose. He did this by his initial meeting with Mr. Nixon. The Vice President showed his intelligence and leadership by replying in kind.

Of course we can't have blind agreement between the two leaders, the two parties, or among all of us. We are still a free nation. But, at the same time, to disagree because of labels, blind prejudice, ignorance, or because of immaturity, could annihilate us.

Whether or not Mr. Nixon takes a place in the new administration is beside the point. He will be a factor in our progress. He is a national figure and will remain so. Mr. Kennedy thinks so too—or he would not have called on him.

The very force of catastrophic factors building up in the world will restrain all of us from running off half cocked. Our "pulling together" may look Pollyannish to the cynics. But the cynics are in for a big surprise over the next many years.

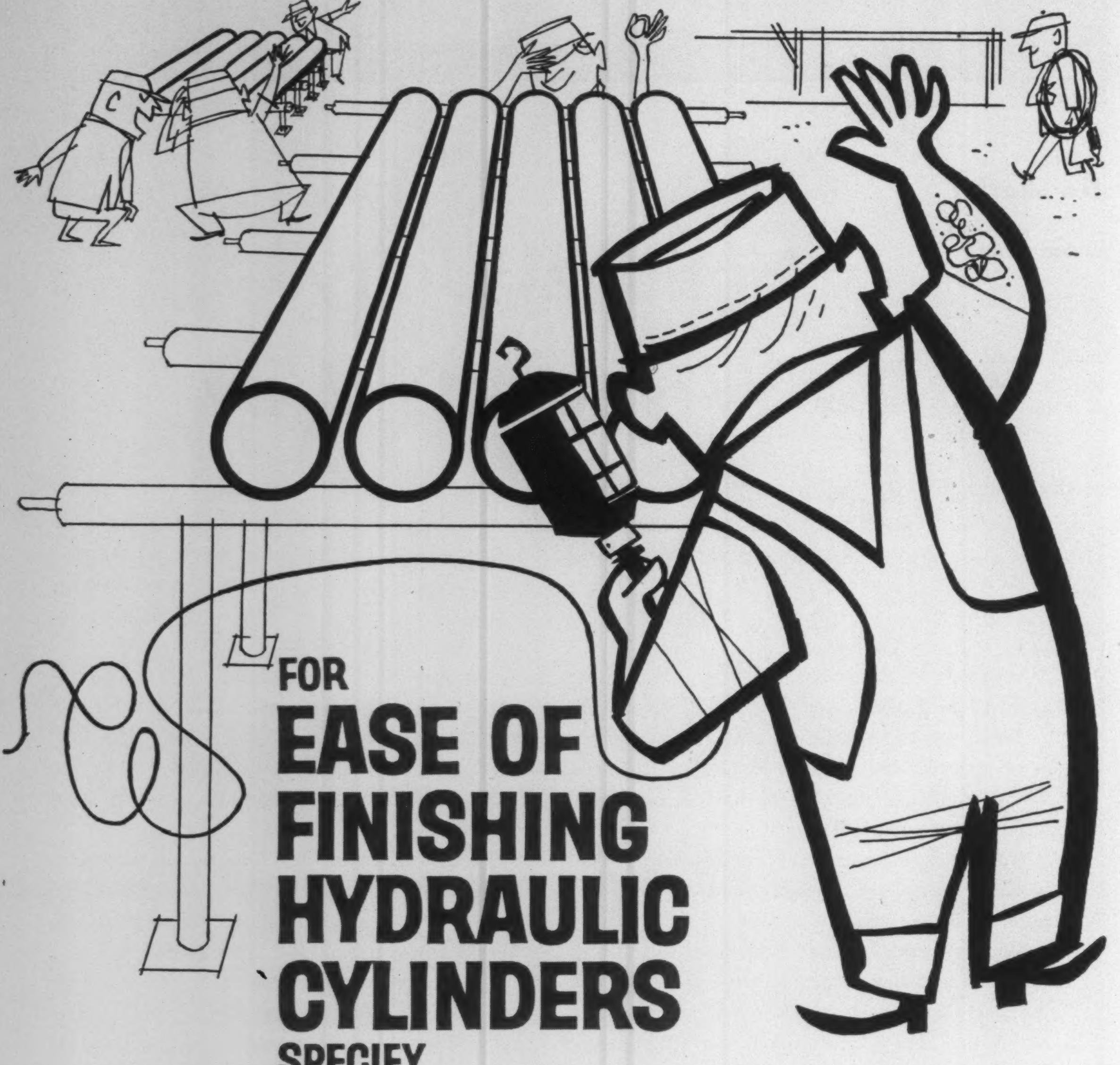
There is no longer any room in our nation for disagreements based on whim, childish carry-overs, lack of understanding, prejudice or the well-known and maligned "human nature."

If all of us do not contribute to our economic and national strength by harder work, more understanding of our problems, support of our elected government and by a willingness to see our peril, then, of course, Mr. Khrushchev may live long enough to see us buried—by the Communists.

Solidarity, unity, and cooperation with logical and reasonable criticism is in order for all of us—every day, every hour, every minute.

Tom Campbell

Editor-in-Chief



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No Short-Term Pickup in Sight

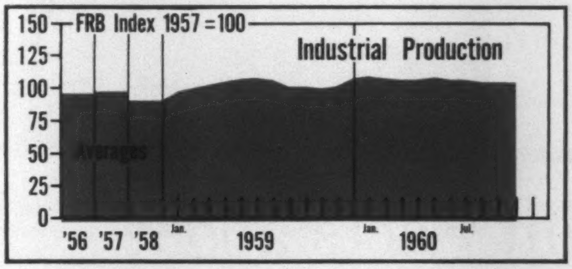
Three of the most important economic indicators are in for October; Industrial production, factory workweek, and personal income (See charts).

The figures for the month are generally favorable. But you will see cautioning notes in each, indicating that November will not be an "up" month. One principal reason is that the big auto production in October was the dominant favorable factor.

Most indicators are not likely to drop off severely in November, however. Non-durables will hold up; services will probably gain. But, for the rest of this year, there is little chance of a general business pickup.

Production Levels, for the Moment

As expected, the Federal Reserve Board's Index of Industrial Production leveled out in October, ending a period of decline. Gains in automotive production over-balanced declines in primary metals. Non-durables picked up a point in the index. However, with no signs of a pickup, and some indications of more slowdowns, the November Index is expected to slide from the October rate of 107.

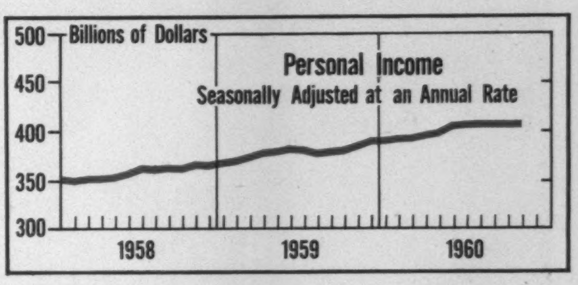


GNP Will Top $500 Billion

Gross National Product in 1960 will be a record $500 billion. This is in spite of the "dislocations" in some major industries, according to M. R. Gainsbrugh, chief economist, National Industrial Conference Board. This is a gain of about 4 pct, but after adjustment for higher prices, the rate of real gain in output is 2.8 pct.

Personal Income Up in October

Personal income gained in October. Again, the main factor is the improvement in auto worker employment and earnings. In addition, there were scattered wage increases. On the adverse side, the strike in the electrical manufacturing industry kept income from going higher. Overall, personal income hit the annual rate of $409.6 billion, up from the September (revised) rate of $408.8 billion.

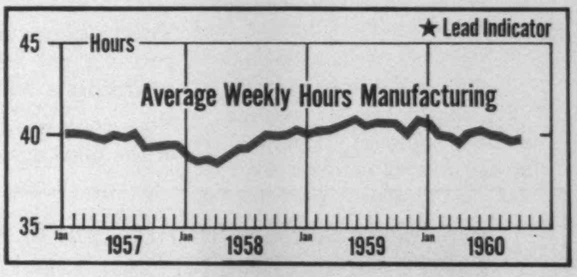


Will Vacancies Hit Building?

Lower interest rates and easier money are generally expected to bring on an uptrend in new home building in 1961. But new concern is now resulting from the rate of vacancies. Although there was little change from second to third quarter in vacancy rates this year, the Dept. of Commerce warns of an upward trend in vacancies, now at 7.6 pct of rental units and 1.2 pct of homes vacant and available for sale.

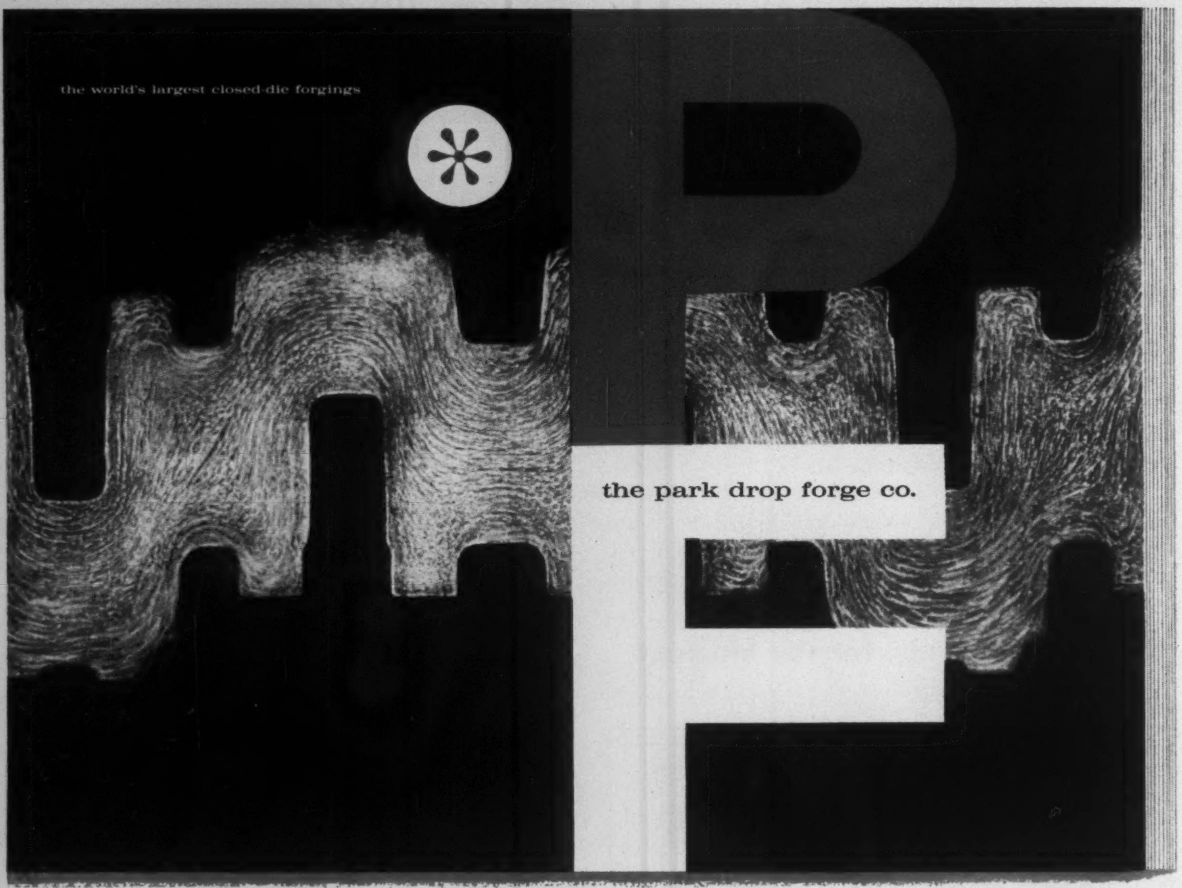
Factory Workweek Edges Upward

The factory workweek picked up a bit in October, from 39.5 hours in September (revised) to 39.6 hours. Here, again, the increase is "dominated by a sharp rise" in the auto industry. With auto production dropping off, at least until sales of new models are evaluated, there is no indication of another upturn in November.



Can Sentiment Move "Sideways?"

The present downturn in business will not be as severe as that of 1957, at least in the opinion of one top authority. George Katona of the University of Michigan's Survey Research Center says the current decline is "fundamentally different" from 1957. The Center, known for its surveys of consumer attitudes, notes a sideways movement in consumer sentiment.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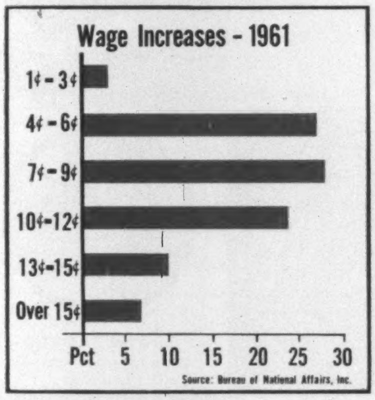
Deferred Wage Hikes Average 8.2¢ for 1961

Deferred wage increases averaging just over 8¢ an hour will become effective in 1961 under terms of contracts now in force, according to a survey by the Bureau of National Affairs, Inc.



Source: Bureau of National Affairs, Inc.

Average increase in manufacturing industries will be 7.3¢; nonmanufacturing industries will average 10.4¢ an hour. However, when construction is not included in nonmanufacturing, the average increase falls to 7.7¢.

More than 1900 increases coming due in 1961 were analyzed. In addition to direct increases, many contracts have escalator clauses. The report points out that the deferred increases will virtualy set a "floor" under next year's wage negotiations.

Layoffs: Too Many Cars Force Cuts at Chrysler

Top-heavy inventories of new cars and seasonal factors are catching up with the auto industry.

Chrysler Corp. will trim production and lay off 1900 production workers Nov. 28. In addition, three of the company's seven assembly plants have been closed all of this week, idling 16,000 workers.

The layoffs will take place at Dodge Main and Plymouth assembly plants in Detroit, and the Newark, Del., assembly plant.

Chrysler says the new production schedules "reflect an adjustment of field inventories." Translated, this means Chrysler has more cars than customers.

More Unemployment?

Labor Dept. officials are predicting that unemployment will increase substantially next year. They say that 1.3 to 1.5 million youths will be leaving school and looking for work in 1961.

This is expected to cause "considerable difficulty in the job market," at least until the middle of the year.

USWA: Campaign Trail

Donald C. Rarick, rank-and-file aspirant to the presidency of the United Steelworkers Union, has started his second campaign to unseat David J. MacDonald.

There's little chance of him winning. He may get a protest vote of about 30 pct of the total vote cast.

No Cut in Work Week

Efforts by labor leaders such as USWA president David J. McDonald to get a 32-hour work week will not get the backing of President-elect John F. Kennedy. Sen. Kennedy doesn't believe shortening the workers' hours is a solution to the unemployment problem.

Teamsters: Handle Hot Cargo

The Teamsters may have found a way around Landrum-Griffin Act's ban against "hot cargo" contracts.

New contract signed with general truckers in New York-New Jersey area contains a revised "Protection of Rights" clause.

Original clause, part of Teamsters' Central States pact, provides that an employee cannot be dismissed for refusing to go through a union picket line or handle "unfair" goods. (Unfair goods are those of companies engaged in a dispute with a union or whose employees are engaged in such a dispute.)

Landrum-Griffin made it an unfair labor practice, with certain exceptions, for an employer and union to have any agreement whereby the employer won't handle products of or do business with any other employer.

New clause says each employee has the right to decide whether he'll do work "he deems contrary to his best interest."

Presumably, the Teamsters will point out to a member anything that might not be in his best interest, leaving it up to the individual to make the right decision as a good union man.

Another element of the NY-NJ contract: Employers agree they will continue to use, handle or transport products of any other employer, regardless of actions of "individual employees exercising their rights." In order to do this, employers can use other employees, including management personnel.

Teamsters will probably make the new clauses part of the Central States agreement, covering truckers in 12 Midwest states, when the present contract expires on Jan. 31, 1961.

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to more precise and profitable toolroom grinding with a CINCINNATI

Have you noticed too many crazy-quilt setups in your toolroom? Some are quite unnecessary. They usually reflect in excessive costs, but can be easily cut down to size with new equipment having greater versatility.

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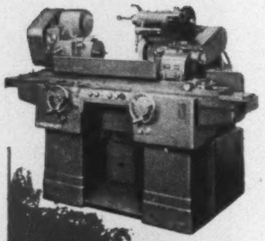

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10" Universal Grinder.
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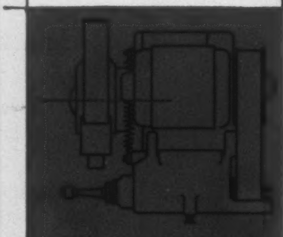
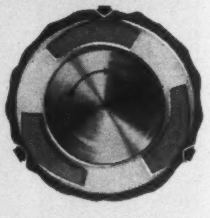
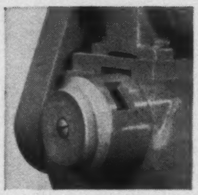


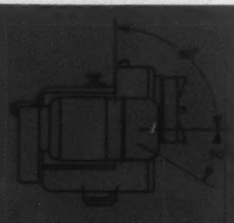
hinge mounted internal grinding head



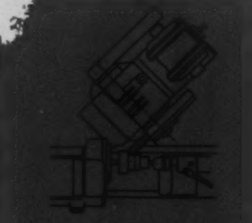
long-life FILMATIC grinding wheel spindle bearings



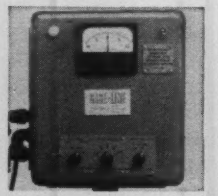
infinitely variable headstock speed selection (AC Drive)



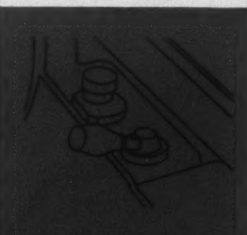
headstock swivels to any practical angle



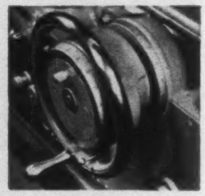
reversible wheel mount for shoulder grinding



Gage-Line taper correcting unit

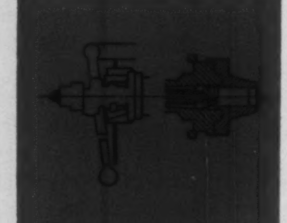


power rapid positioning of wheelhead

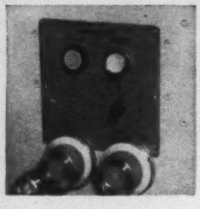


size adjustments in increments of .000050"

CINCINNATI FILMATIC 12" Universal Grinding Machine. Other sizes: 14" and 18". Catalog No. G-736.



quick acting draw-in collet attachment



push-button dual rate automatic infeed

PRECISION GRINDING MACHINES: CENTERTYPE • CENTERLESS • MICRO-CENTRIC • ROLL • CHUCKING • CENTERLESS LAPPING

CINCINNATI®
GRINDING MACHINE DIVISION

By R. W. Crosby

★ Kennedy "Props" Planned

President-elect John F. Kennedy will begin throwing administrative and legislative props under the steel industry as soon as he takes office in January.

Senator Kennedy has continually expressed dismay at what he says is a slack operating rate in basic steel. He will try to stimulate steel production in the belief it will lift the "sagging" economy.

The President-elect says slack steel production has been caused by a lack of Federal public works projects, high interest rates, and the Eisenhower Administration's hard money policy.

The first prop he will use is the power of the Presidency. He will use the influence of his office to bring the Federal Reserve Board into line with his easy money policy.

An abundant money supply at lower rates of interest is a Kennedy goal. He hopes this will push more private money into investments to expand production rather than fixed investments.

The second prop, more important but longer in range, is legislation. He will ask Congress to set up new Federal construction and public works programs requiring considerable steel tonnage.

He will seek big housing and school construction programs and bold new public works projects. Steel-using public works projects, such as dams, will get priority. So will aid to depressed areas, particularly steel and coal mining communities.

The 87th Congress will go to work on these projects in January. Passage seems assured.

Only one question remains: From where will the money come to pay for them? Senator Kennedy says it will come from increased economic activity. His opponents say it can come only from higher taxes, and increased national debt or inflation.

■ Federal Agencies Will Be Revamped

The revamp of Federal regulatory agencies, started under President Eisenhower, will reach a fever pitch under President-elect Kennedy.

Reorganization of the agencies is a means of stiffening regulation of business. Senator Kennedy's main target is the amount of time it has taken in the past for the various boards to review merger actions, rate adjustments and other important industry decisions.

Some agencies will be shaken up, others will expand. Particular emphasis will be put on expanding the Federal Trade Commission, one of Senator Kennedy's favorite Federal groups. Revamping will also be done on the Interstate Commerce Commission, the Civil Aeronautics board, the Federal Power Commission, and the National Labor Relations Board.

■ Tariff Bargaining: Industry Can Advise

The metalworking industry will get another chance to make its views on tariffs felt at the International Tariff Negotiations which begin in Geneva in January.

Industry leaders will be among 12 advisers and perhaps 70 consultants soon to be asked by the Eisenhower Administration to help guide U. S. bargaining at Geneva.

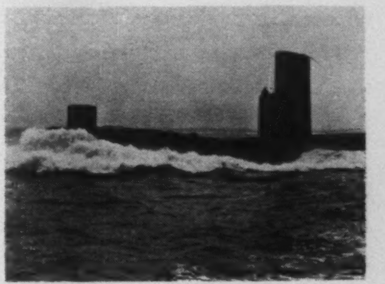
Industry, labor, agriculture, and public interest group representatives will be asked for advice on particular fields as the negotiations proceed. The dozen advisers will accompany U. S. delegates to Geneva. The consultants will remain in the U. S.

■ Army, Navy Push Modernization

Army and Navy budgets now being prepared for the next Congress keynote these two services' push for modernization. Both are fighting to maintain an equal spot with the Air Force.

Modernization, with emphasis on weapons of the future, is their main hope for autonomous survival.

The Army is putting special emphasis on weapons for chemical and biological warfare. Army sources say they expect to double outlays for chemical and biological warfare over the next several years.



NAVY: Bigger Budget?

The new Navy budget going to Congress in January is expected to make a special call for expanded development of anti-submarine forces.

Naval authorities back up the call with mounting evidence that the Russian undersea fleet is growing fast. The Navy is working on both fixed and mobile submarine detection devices to act as "burglar alarms" for enemy submarines.

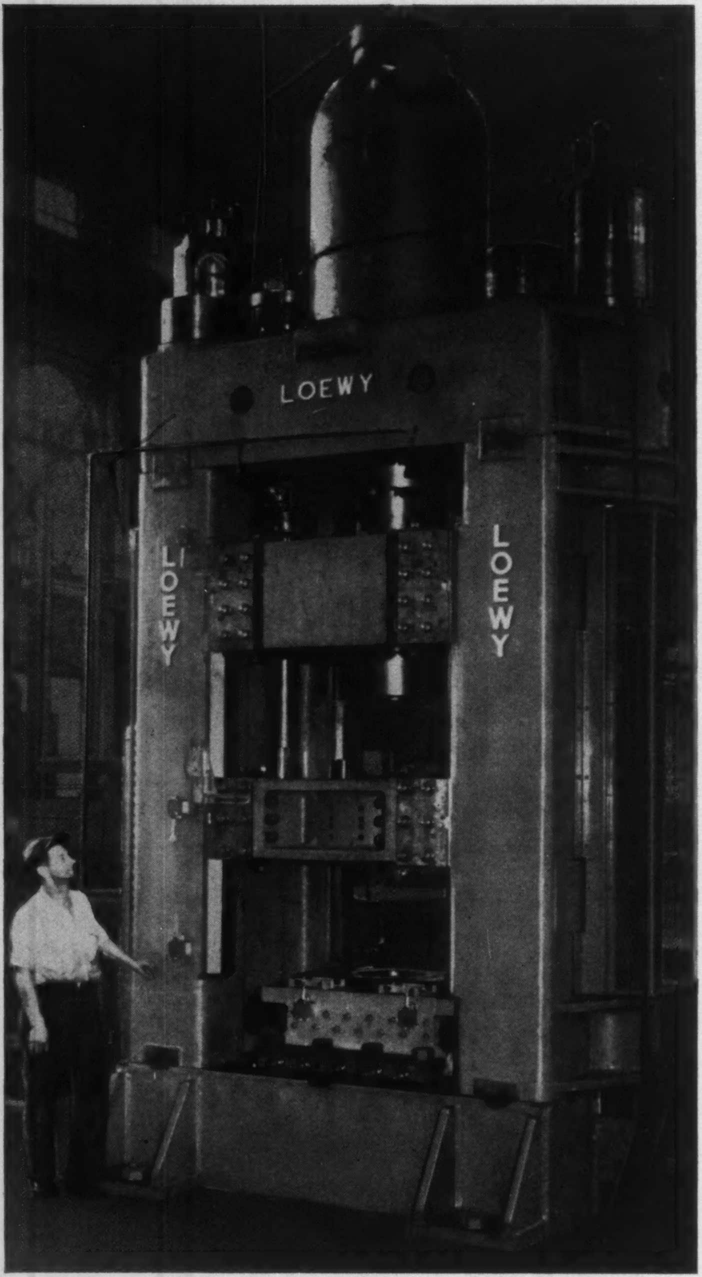
NOW! For research on exotic metals B-L-H develops combined extrusion-forging press

A LOEWY combination press of 1000-ton capacity for extruding and forging rare and high-temperature metals has been developed by Baldwin-Lima-Hamilton and installed at a research laboratory of a large Government facility.

The vertical frame machine is water-hydraulic accumulator driven and designed for the ultra-high speed performance and quick tonnage control required for work on critical material.

The effective pressing speed, infinitely variable up to about 1000 in. per minute, allows use of the machine for a maximum range of metallurgical research work. A 3-cylinder arrangement permits operation at ⅓, ⅔ and full tonnage of the press. Instantaneous changeover is effected from the operator's pulpit.

This versatile machine is designed for direct and indirect extrusion. And when used for free forging, it provides both deep penetration and fast planishing. In sum, it is one more striking example of B-L-H's ability to supply industry with the highly specialized equipment required of today's metallurgical laboratory research. Let us know your needs and be assured they will be given our best attention. Write Dept. A-11.



B-L-H's combined extrusion-forging press of 1000-ton capacity on the erection floor.

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Industrial Equipment Division · Philadelphia 42, Pa.

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Steel Exports Decline As Imports Rise

Steel exports plummeted to their lowest point since last March as September shipments totaled only 226,000 tons, says the Dept. of Commerce. This figure is 102,000 tons below August, 1960. On the other hand, it is 166,000 tons above September, 1959, but this offers little consolation as the steel industry at that time was strikebound.

Imports, however, rose to their highest point since June. September totals reached 207,000 tons, narrowing the export-import gap significantly.

Steel sheets accounted for 60,000 tons of the export decline. This is due primarily to the cutbacks by the suffering British auto industry. Rails and accessories, tinplate and structural shapes also showed decreases.

For the first nine months of 1960 steel exports totaled 2.3 million tons, and accounted for 4.1 pct of total shipments by U. S. steelmakers.

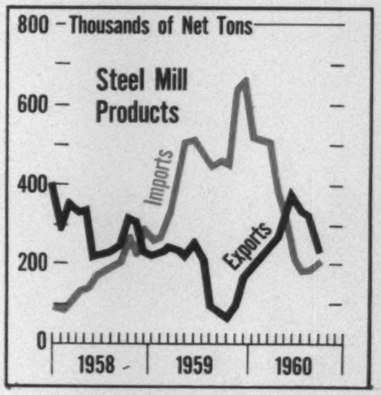
Commerce says 1960 will be the best steel export year since 1957.

But steel imports are also showing impressive gains. Imports for the first nine months totaled 2.8 million tons. This is only slightly below the 3 million tons for the same period in 1959, and represents 4.8 pct of the new steel available in the U. S. Imports for the year will be topped only by 1959's total of 4.4 million tons, says Commerce.

But while exports did dip, U. S. steel mills are continuing their probe into world markets with a view to possible production facilities abroad.

One mill is reportedly considering an agreement that would transfer merchant wire equipment to Japan and give the company an interest in a plant there.

At least two steel mill presidents have been abroad in recent weeks, one going to Europe and the other to India. With one of them went the company's sales vice president, the head of tubular sales, and the market research chief.



Another factor in U. S. participation in steel markets abroad:

It's known that some American steel mills are contracting for tonnage of steel produced abroad; then selling it in foreign markets through their own international organizations.

British Toolmakers At Peak Level

British machine tool makers have order backlogs for a year and production is running at a peak rate. Cutbacks in the auto and domestic appliance industries have restricted the flow of new orders, but as yet have not had any effect on operations.

If the falloff in orders continues, it is likely to reflect on imports, though many of the tools entering Britian are types not made there. As delivery dates began lengthening in the early spring of this year, imports of machine tools increased. During the first nine months of this year dollar value of imports reached $47 million. This is compared to $33 million for the same period in 1959.

Reds Building Mill In Ceylon

Russia has put its far-reaching hand on another steel plant market. Its experts have submitted a report on the iron and steel works to be set up in Ceylon, a project to cost $31 million. Of this total, about 65 pct will be supplied by the Reds under the agreement on economic and technological cooperation signed between the two nations in 1958. Under that agreement Ceylon was granted a substantial loan.

The proposal for the facility is twofold. The first calls for a steel rolling mill to be built which would use imported blooms at the start of operations. Capacity is set at 35,000 tons of rolled products a year. The second phase calls for the erection of a blast furnace shop.

While progress is being made on construction of the facility, Ceylonese mill operators will be trained in Russia.

Argentine Steel Grows, Suppliers Here Benefit

U. S. makers of steelmaking material and equipment are in line to benefit from the expanding Argentine steel industry.

The Export-Import bank of Washington, D. C., has authorized a $12 million loan to the Argentine steel producing firm Sociedad Mixta Siderurgia Argentina (SOMISA). The credit will be used to purchase materials and equipment here to help complete construction at SOMISA's plant at San Nicolas. An earlier Eximbank loan of $60 million was authorized in 1955 to SOMISA for U. S. equipment.

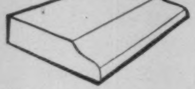
Total cost of the present facility is estimated at nearly $322 million, with close to $130 million being spent for outfitting by U. S. suppliers.

(Inland "job-tailored" Cold Rolled Sheets)

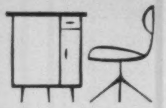
SURFACE

In a dancer, this is a visual quality. In Inland Cold Rolled Sheets, characteristics of surface are far more complex—"tailor-made" for your specific manufacturing operation, plant equipment, and for the function of your end product.

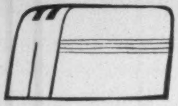
For example, the sheet surface for the fabrication of an automotive floor pan must hold enough die lubricant to permit the draw to be made speedily and efficiently. In electrostatic painting, a too-rough surface may raise costs by holding an excess of paint. A too-smooth surface may create its own problems. For plating, painting, improved die practice, for a host of manufacturing techniques, different surfaces are often required, *and for each—Inland supplies the exactly-right Cold Rolled Sheet!*



Inland Cold Rolled Sheets assure oven hoods a smooth surface that finishes to a lustrous gleam—give a competitive edge so necessary in today's market.



Steel office furniture units made of Inland Cold Rolled Sheets have smooth surfaces, and the attractive utility that helps clerical efficiency.



Because toaster shells require an excellent surface for chrome plating, it's only natural so many are made of Inland Cold Rolled Sheets.

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Make Better Diecastings

European automakers are making large diecastings of both aluminum and magnesium. They're casting parts the size of engine blocks that are dense and free from the porosity which plagues some American plants. Success is attributed to the heavier equipment used, longer dwell times and careful material and process controls.

Produce Purer Steels

A dual-phase steelmaking development improves vacuum-melted steels. First, a truly vacuum-tight hopper top introduces additives into the molten steel while the steel is still in the ladle. Then the steel is poured through a blanket of argon into sealed, argon-filled molds.

Caps Replace Tie Rods

Special hydraulic cylinders, designed to withstand rugged and continual use at 3500 psi, have been developed by army engineers. These cylinders serve in the armored-vehicle-launched bridge, or "scissors" bridge as it's commonly called. Instead of tie rods, the new cylinders use caps which are screwed onto the cylinder tubes. Tests and field service prove these cylinders withstand 7000 psi with no leaks or failures.

Square-Butt Welding

Heavy 1¼-in. wall aluminum cylinders are now being welded more economically, in fewer passes, with less total heat input, and at greatly reduced speeds. The technique is square-butt Mig welding. This method eliminates preheat, back chipping and stringer-bead passes. The cylinders are earmarked for the nuclear industry.

Computers Aid Managers

Computer systems reduce semi-finished inventories and provide economic benefits in steel plants. Unit schedules can be assembled accurately, with little manual effort. This leads to timely and correct order-status reports and a mechanical-incentive computation. Other benefits of data-processing systems lie in the area of scientific management. While intuition, based on judgment and experience sets policies, application to recurring situations becomes routine.

Repair with Plastic Lead

Plastic putty-like lead speeds the repair of lead-lined tanks. This new compound consists of 94-pct lead and 6-pct thermosetting plastic. Worked when soft, it becomes tough and rigid in about three hours after a hardening agent is applied. No flame, heat or pressure is needed. When the patch sets, it can be sawed, drilled or machined like ordinary lead.

Improve Electro Machining

Recently announced is a new carbon-electrode material for electrical-discharge machining. These electrodes cut three times as fast as brass electrodes. And they wear only a third as much while making machining easier. This development could overcome one of the major limitations that block the use of EDM in many areas of metalworking.

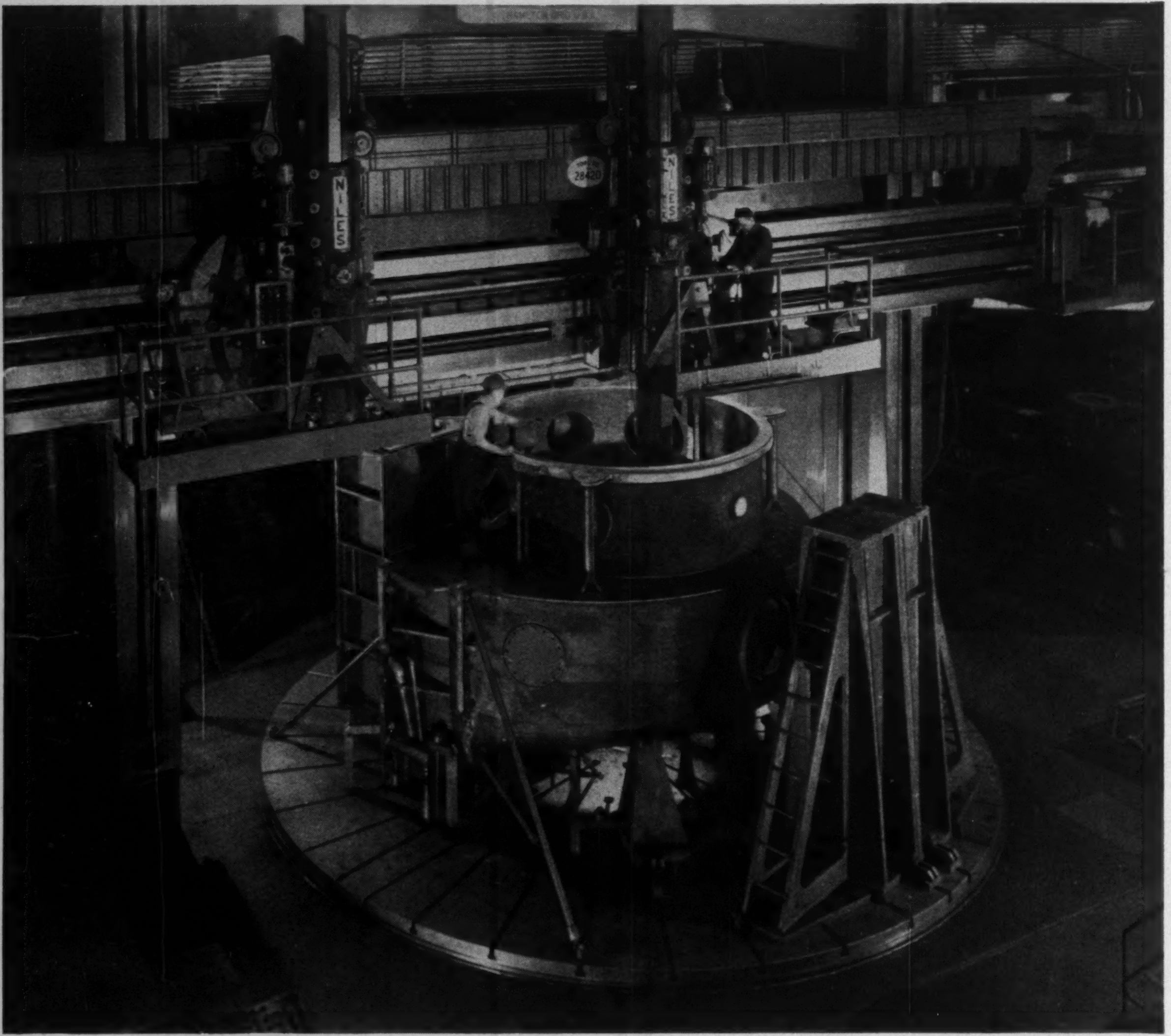
Rubber Serves as Bearings

Nonferrous-metal bearings are in short supply in the Soviet Union. As a result, the Russians use rubber bearings in many machines where lubrication with oil isn't permissible. Rubber thrust bearings also serve in some cases where shock loadings may occur. These bearings are lubricated with water. Since water is much thinner than oil, the rubber bearings require extensive conditioning to insure the formation of a hydrodynamic film when the machines are used.

Use Sand-Cast Aluminum

Sand castings can compete successfully with other large aluminum castings for use as engine blocks and heads. This is the word from a leading foundry authority. This specialist says that his foundry, with a single set of patterns, turns out 200 cylinder blocks an hour. He also cites lower tooling costs, less maintenance and lower unit expenses than with other casting methods.

ALLIS-CHALMERS



Rough-boring of fabricated steel low-pressure castings at Allis-Chalmers.

Test track for our own products

Experience in metal fabrication guides the design of products we offer you

Nobody understands the requirements of equipment for the metalworking industry better than people who are in it. As one of the world's largest metal fabricating companies, Allis-Chalmers sees first-hand how its own motors, control, pumps, and induction heaters perform under the severe everyday conditions of heavy usage, abrasive atmosphere and heat.

This experience with our own products lets us know their strong points . . . as well as the areas which might need greater improvement. It guides the design of our products in many ways . . . gives us operating results quickly . . . improves products with a realistic view of the actual conditions in the metalworking industry.

This system of proving Allis-Chalmers equipment and components in our own day-to-day "test track" is one of your greatest assurances of reliability, suitability, quality. *For further information call your nearby A-C distributor, representative, or write* **Allis-Chalmers,** *Industrial Equipment Division, Milwaukee 1, Wis.*

• • •

A-C products for the metalworking industry: Centrifugal and Vacuum Pumps, Compressors, Motors, Control, Valves, Induction Heaters, Rectifiers, Transformers, Switchgear, Unit Substations, Water Conditioning Systems, plus Material Handling Equipment.

A-1320

LETTERS FROM READERS

For a Degree

Sir—At the present time I am gathering information concerning the 1959 steel strike which forms the subject of my thesis for my Master's Degree. In the course of my research, I noted that The IRON AGE has published a document entitled, "An Interpretative Report of the 1959 Steel Strike—Its Issues, Implications, and Impact." It would be deeply appreciated if you would forward a copy of this booklet to me. Any other information relating to the steel industry would be further welcomed.—Joseph J. Culhane, Hyattsville, Md.

▪ The requested booklet is enroute. —Ed.

Thanks

Sir—Thanks for publishing the much-needed, well-done article on high strength steels which appeared in your Oct. 6 issue. This many faceted topic is covered clearly with very good balance between properties, availability and applications as well as clarification of the existing (and often-times confusing) terminology.—L. Anselmini, International Nickel Co., Inc., New York, N. Y.

With Interest

Sir—We have noted with interest the article "Fluidized Bed: New Approach to Rapid Heat Treating," which appeared in your Oct. 13 issue. It would be deeply appreciated if you would send us a copy of this article.—R. F. Malone, Crucible Steel Co. of America, Midland, Pa.

▪ It has been mailed.—Ed.

Pertinent

Sir—I have come across a copy of your reprint of "Long Term Impact of the Common Market." It is so precisely pertinent to so many elements included in my course at New York Univ. entitled, "The Management of Foreign Trade," that I am impelled to ask whether I could be supplied forty copies for use in that class.—Edwin F. Wigglesworth, associate professor of marketing, New York Univ., New York, N. Y.

▪ The reprints have been mailed.—Ed.

Fine Service

Sir—It would appear that you have done a fine service for all who took the time to read your editorials on the National Issues. And, while in some instances certain comments were controversial, I personally believe they were, and could continue to be, the stimuli for further thought among any interested reader. If it is possible, I would appreciate receiving three more sets of these editorials for distribution among friends who would do well to read them.—Fred M. Emens, Wollensak Optical Co., Rochester, N. Y.

▪ They're on the way.—Ed.

And a Third . . .

Sir—May we call your attention to the story on p. 50 of your Nov. 3 issue—especially to the reference that only two major steel producers earned their dividends in the third quarter? There was a third, we are proud to say, and it was Armco. After working so hard to achieve earnings of $11,693,836, Armco men and women rather missed not being included.—David Thompson, Armco Steel Corp., Middletown, O.

▪ At the time the issue went to press, we had only Armco's earnings figures. We are happy to add another dividend earner to the group.—Ed.

Congratulations

Sir—I have just finished reading The IRON AGE editorials pertaining to the Presidential elections. I found this material to be of great interest and your publication is to be congratulated for this outstanding piece of public service.—Robert P. Vivian, American Cyanamid Co., New York, N. Y.

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Southern
SCREW COMPANY
STATESVILLE - NORTH CAROLINA

Gulfcut® 45A oil cuts machining time almost in half, permits

GULF MAKES THINGS

Trouble! The Millar and Frey Screw Machine Products Company, Union, New Jersey, found plenty when it recently contracted to produce a small machined steel part. Specifications called for drilling a deep, blind hole — perfectly flat at the bottom. They also required a hole sidewall that forms perfect right angles to the bottom. Close sidewall tolerances. And a fine finish—with no burrs left in the hole. To handle these machining requirements, Millar and Frey tried six different cutting oils. All failed.

And then, the company tried Gulfcut 45A—a highly compounded sulfo-chlorinated-lard oil. The results: Not only were the requirements met, but Gulfcut 45A enabled Millar and Frey to increase speeds and feeds 48 percent, and slash machining time from 34 to 18 seconds.

In addition, Millar and Frey stepped up the production of a small tellurium copper component with Gulfcut 45A. Edmund Frey, one of three partners, says, "Now, we're machining tellurium copper at brass speeds. Our tools

Round up. Typical parts machined by Miller and Frey Screw Machine Products Company. Gulfcut 45A is used on 75 percent of all machining jobs.

MILLAR & FREY
MACHINE PRODUCTS

Left to right, Edmund Frey, J. H. Schindler, Gulf Sales Engineer, and Robert Millar. Both partners agree that Gulfcut 45A gives top performance.

◀ **Tellurium copper component.** It's being machined at brass speeds, thanks to Gulfcut 45A.

48% increase in feeds and speeds . . .

RUN BETTER!

last longer. Gulfcut 45A doesn't stain or discolor the working piece either."

Today, Millar and Frey use Gulfcut 45A on 75 percent of their machining jobs. Ed Frey tells why: "This oil is the most efficient, all-round cutting oil I've ever used."

If you've got a machining problem, try the Gulfcut line. See for yourself why Gulf makes things run better! Just call a Gulf Sales Engineer at your nearest Gulf office. Or, write for illustrated literature.

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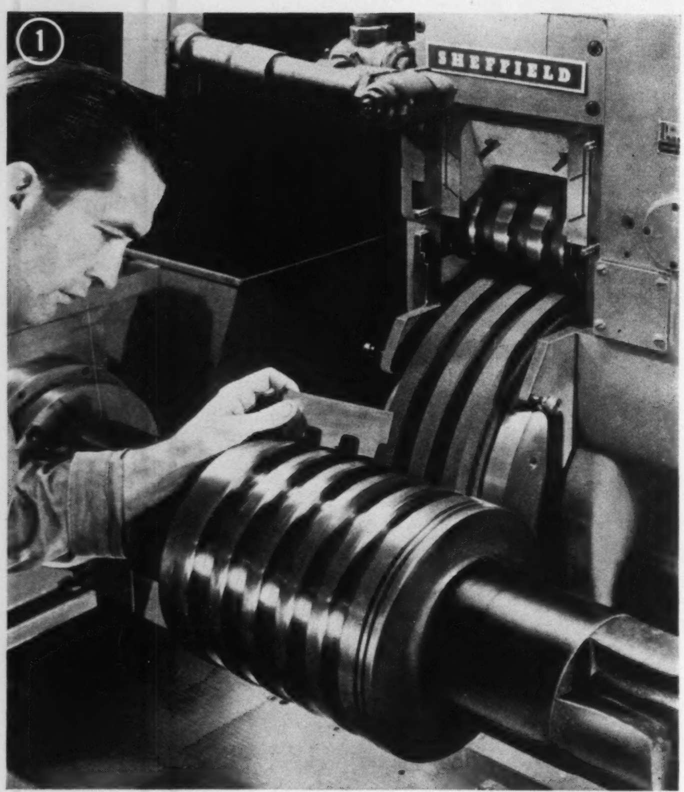

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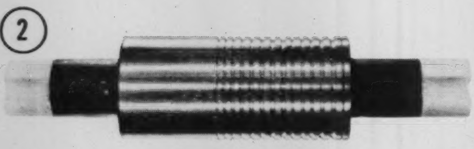

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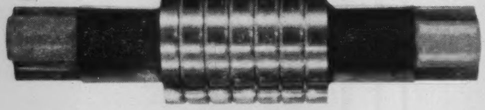

Hardened rod and bar mill rolls ground five to ten times faster

Spectacular time and cost savings result from Sheffield's Crushtrue® method of grinding mill rolls on the latest Model 180 and 181 Multi-Form grinders. For example, the large bar edging roll (1) was ground in six hours, as against 45 hours by conventional turning—a saving of 86%. The small edging roll (2) was ground in 80 minutes, a 98% reduction from the 72 hours previously required! The roll for sled runners (3) has narrow T-section grooves, was ground in 1¾ hours as against a 50-hour turning job.

Sheffield is currently building Model 190 grinders for rolls as large as 6′ x 14″ and as heavy as 3000 pounds.

Write for full details about Sheffield roll grinders, Crushtrue® grinding, and Sheffield's contract grinding services.

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Inspection Gages, Dimensional Control Instruments, Machine Controls, Automatic Gaging & Assembly Systems, Measuray® X-Ray Thickness Measuring, Crushtrue® & Multiform® Grinders, Cavitron® Ultrasonic Machine Tools, Press-Pacer® Transfer Units, Large Dies, Tooling, Contract Manufacturing.

FATIGUE CRACKS

Communications

If we may be permitted an uneducated guess, we'd like to guess that the communications business is just about the most important business in the world, if not the largest.

Some people make a lot of money in it, others hack it to a shred. The election, many observers will tell you, was decided as it was because one man did a better job of communicating than the other.

And on Paper—One of an editor's toughest tasks is that of getting ideas off the printed page and into the readers' minds—with a minimum of confusion.

So you can see how the editorial eye was caught by a rather nice definition in a recent Daystrom, Inc., advertisement. It reads, in part:

> **"A communication is anything which conveys a message . . . from one man to another . . . from a visible subject to a photographic plate . . . from one part of a machine to another . . . from any source to any receiver. Signals are those portions of a communication which originate at the source. Noise is that portion which intrudes into the communication enroute to the receiver. Signals and noise are always intimately mixed in every message—though in varying proportions. Both are carriers of INFORMATION—relevant information, on the one hand . . . spurious, on the other."**

We try, in writing, re-writing and editing this magazine to keep the noise level at a minimum so you'll get only the relevant information. The more time editors put into this effort, the less time it takes you to receive the message.

Which brings to mind a "Notice" one of our editors picked up in a railway station a year or so ago—and has been trying to translate into English ever since. If you think you know what it says (see below) please write. Or if you'd like a copy suitable for framing just ask and we'll send one as long as our supply lasts.

NOTICE

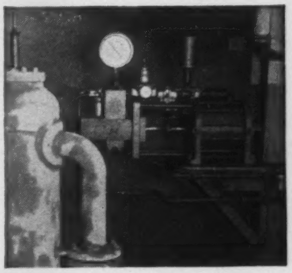
Notice is hereby given that under supplements to tariffs filed with the Illinois Commerce Commission, all one-way and round-trip fares for distances of 38 miles or less in Chicago and North Western Railway Company Chicago suburban territory, and all 10 and 25 multiple-ride tickets in this territory, will be limited for passage and void on the effective date of the previously filed supplements presently suspended and subject to investigation and hearing by the Illinois Commerce Commission in its Docket No. 44741, or the effective date of any further supplements filed to supersede the aforesaid supplements. In no event, however, shall any such ticket be valid for passage for a period longer than the period provided under tariff provisions under which the ticket was sold.

As of the effective date of the aforesaid supplements, the refund basis for unused 10 and 25 multiple-ride tickets which have been limited for passage and rendered void as above provided will be changed from the present basis to a straight pro rata basis. The present refund basis for one-way and round-trip tickets will remain unchanged.

Chicago and Northwestern Railway Company

WANT RELIABLE HYDROSTATIC TESTING TO 50,000 PSI?

Aldrich Air-Driven Hydraulic Pumps are rugged, compact... the perfect answer for production or laboratory needs . . . Operate on normal plant air . . . Immediate shipment from factory stock.



FOR HIGH PRESSURE VESSELS—Maker of unfired pressure vessels tests production units with Aldrich air-driven hydraulic pump, in accordance with A.S.M.E. Boiler and Pressure Test Code.

OR CASTINGS—Castings and forgings for missile, nuclear, and other industries are tested in this rig on a production-line basis. Source of hydraulic pressure is an Aldrich pump. This unit has capacity of 12,100 psi. Other pumps available for pressures to 50,000 psi. Special units to 100,000 psi.

Aldrich air-driven hydraulic pumps are dependable, economical to operate and easy to install. Write today for Data Sheet 36 (6-inch stroke) or Data Sheet 36A (3-inch stroke).

ALDRICH

ALDRICH PUMP COMPANY
8 Pine Street, Allentown, Pa.

"Chase® metals save 50% on buffing operations," *says John Linkamper, Purchasing Agent for Coppercraft Guild Gift Wares*

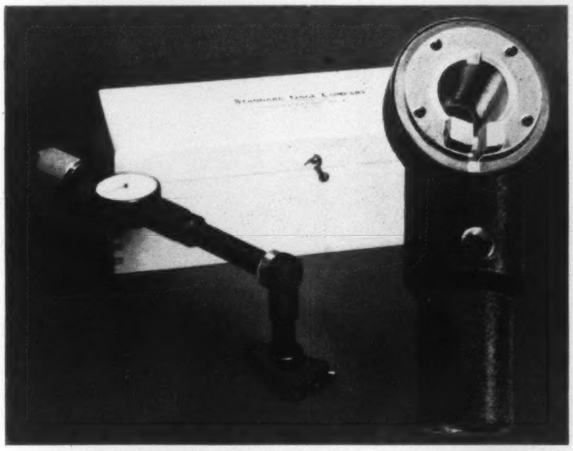
Coppercraft Guild Gift Ware is sold in the home, from samples—and has won its position of leadership through its matchless appearance. The slightest flaw in surface or finish could prevent a sale to Coppercraft Guild's discriminating customers. Mr. Linkamper reports that Coppercraft, a division of Armor Bronze and Silver Co., has had uniformly high acceptance for 65 or more items they make using Chase brass and copper.

Prior to using Chase metals, production problems were caused by critical deep-draw operations and the need for lengthy buffing and polishing. Then Chase metallurgists were presented with the problems... recommended a Chase alloy which withstood the deep draw perfectly and provided a 50% reduction in buffing and polishing. Added advantage: the stocks of metal in the nearby Chase Multi-Metals Service Center made it possible for Coppercraft Guild to order from stock, saving on storage space, metals inventory and handling.

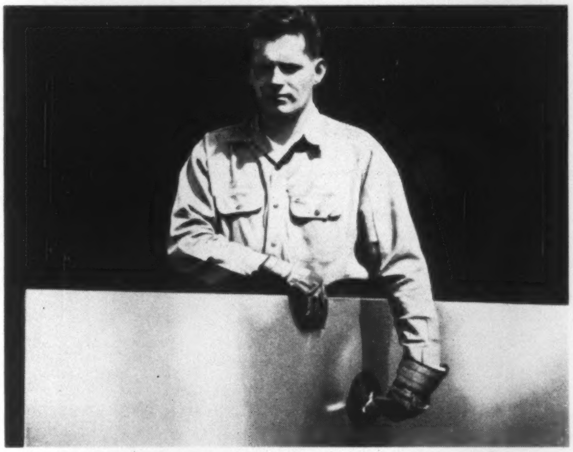
End result of this co-operation between Chase and the manufacturer is reported to be "the exact appearance and quality we want... fewer rejects... 50% reduction in buffing costs... enabling us to lower our costs."

Chase metals and Chase skills are ready to serve you in the same way.

NEW 3-MARK ROD is the free-cutting brass rod designed by Chase to meet the demands of modern high-speed machines. Cuts freely with short chips . . . is extremely straight to cut down whip. Check coupon for details on 3-Mark Rod.



THIS CHASE FORGING, for the trunnion of the gauge shown above, gives excellent dimensional accuracy. Chase forgings are die-pressed, made to close tolerances, free from pits and blowholes. Need far less finishing, too.



NEED STAINLESS OR ALUMINUM? The Chase Multi-Metals Service Center nearest you has the types and quantities you want. Call for a copy of the latest stock lists, or check and return the coupon at the right.

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BRASS·COPPER
STAINLESS

Chase Multi-Metals Service Centers:

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695 Stewart Ave., S.W.
Tel. PLaza 5-5731

BALTIMORE 30, MD.
1315 Key Highway
Tel. PLaza 2-2565

BOSTON 4, MASS.
411 "D" Street
Tel. LIberty 2-0126

CHARLOTTE 2, N. C.
222 S. Church St.
Tel. EDison 2-4152

CHICAGO 39, ILL.
5401 W. Grand Ave.
Tel. TUxedo 9-4000

CINCINNATI 2, OHIO
222 Post Square
Tel. PArkway 1-3326

CLEVELAND 3, OHIO
4000 Chester Ave.
Tel. HEnderson 2-2300

DALLAS 7, TEXAS
5052 Sharp St.
Tel. FLeetwood 7-8187

DENVER 16, COLORADO
5101 Colorado Blvd.
Tel. DUdley 8-2441

DETROIT 38, MICHIGAN
14480 Woodrow Wilson Ave.
Tel. TOwnsend 8-2939

GRAND RAPIDS 2, MICH.
200 Division Ave., N.
Tel. GLendale 9-7136

HOUSTON 1, TEXAS
16 Drennan Street
Tel. CApitol 2-7266

INDIANAPOLIS 21, IND.
1609 Oliver Avenue
Tel. MElrose 7-1543

KANSAS CITY 8, MO.
1710 Washington St.
Tel. VIctor 2-1710

LOS ANGELES 54, CALIF.
6500 E. Washington Blvd.
Tel. RAymond 3-5351

MILWAUKEE 1, WIS.
1741 W. St. Paul Ave.
Tel. DIvision 2-7630

MINNEAPOLIS 3, MINN.
145 N. Tenth St.
Tel. FEderal 6-4661

NEW ORLEANS 25, LA.
1000 So. Jeff. Davis Parkway
Tel. HUnter 6-5441

NEW YORK—NEWARK
55-60 58th St.
MASPETH 78, L. I., N. Y.
Tel. TWining 4-0500
Tel. BIgelow 8-1700

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Tel. BAldwin 3-5800

PITTSBURGH 33, PA.
1001 Brighton Road
Tel. CEdar 1-7900

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66 Branch Avenue
Tel. DExter 1-2300

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45 Exchange St.
Tel. HAmilton 6-3959

ST. LOUIS 10, MO.
4641 McRee Ave.
Tel. PRospect 6-3111

SO. SAN FRANCISCO, CALIF.
230 Shaw Road
Tel. JUno 3-4994 or PLaza 6-4809

SEATTLE 4, WASH.
1957 First Ave., S.
Tel. MAin 4-1862

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Please send me information on the following:

☐ Sheet and Strip
☐ Stainless Steel Stock List
☐ Forgings
☐ Aluminum Stock List
☐ Chase 3-Mark Rod

NAME & TITLE____________________

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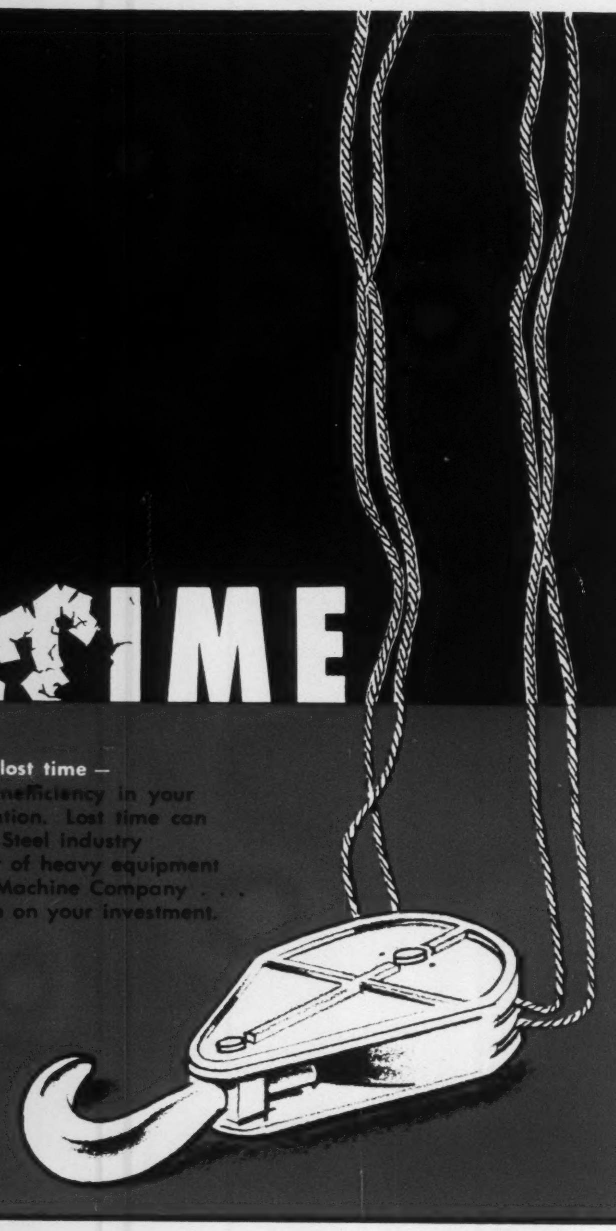

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COMING EXHIBITS

Power and Mechanical Engineering Show—Nov. 28-Dec. 2, Coliseum, New York. (American Society of Mechanical Engineers, 29 W. 39th St., New York 17.)

Plant Maintenance & Engineering Show — Jan. 23-26, International Amphitheatre, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

MEETINGS

NOVEMBER

Electronic Industries Assn.—Winter conference, Nov. 29-Dec. 1, Fairmont Hotel, San Francisco. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

Iron & Steel Div., The Metallurgy Society of AIME—Annual Electric Furnace Committee conference, Nov. 30-Dec. 2, Morrison Hotel, Chicago. Society headquarters, 29 W. 39th St., New York 18, N. Y.

DECEMBER

American Institute of Chemical Engineers—Annual meeting, Dec. 4-7, Statler Hotel, Washington, D. C. Institute headquarters, 25 W. 45th St., New York.

American Mining Congress—Annual membership meeting, Dec. 5, Plaza Hotel, New York. Headquarters, 1200 18th St., N. W., Washington, D. C.

The Electric Overhead Crane Institute—Annual meeting, Dec. 6, Carlton House, Pittsburgh. Institute headquarters, One Thomas Circle, Washington 5, D. C.

JANUARY

The Institute of Scrap Iron & Steel, Inc.—Annual convention, Jan. 8-11, Hotels Fontainebleau and Eden Roc, Miami Beach, Fla. Institute headquarters, 1729 H St., N. W., Washington 6, D. C.

Aluminum Window Mfrs. Assn.—Annual meeting, Jan. 9-12, Emerald Beach Hotel, Nassau, Bahamas, Association headquarters, 630 Third Ave., New York.

Society of Automotive Engineers, Inc.—Annual meeting, Jan. 9-13, Cobo Hall and Convention Arena, Detroit. Society headquarters, 485 Lexington Ave., New York, N. Y.

Hoist Manufacturers Assn., Inc.—Annual meeting, Jan. 10, Statler Hotel, Cleveland. Association headquarters, One Thomas Circle, Washington.

Steel Shipping Container Institute, Inc.—Winter meeting, Jan. 17-18, St. Regis Hotel, New York. Institute headquarters, 600 Fifth Ave., New York.

Steel Plate Fabricators Assn.—Annual meeting, Jan. 18-20, Logo Mar Hotel, Fort Lauderdale, Fla. Association headquarters, 105 W. Madison St., Chicago.

Industrial Heating Equipment Assn., Inc.—Annual winter meeting, Jan. 23-24, Dearborn, Mich. Association headquarters, 2000 K St., N. W., Washington, D. C.

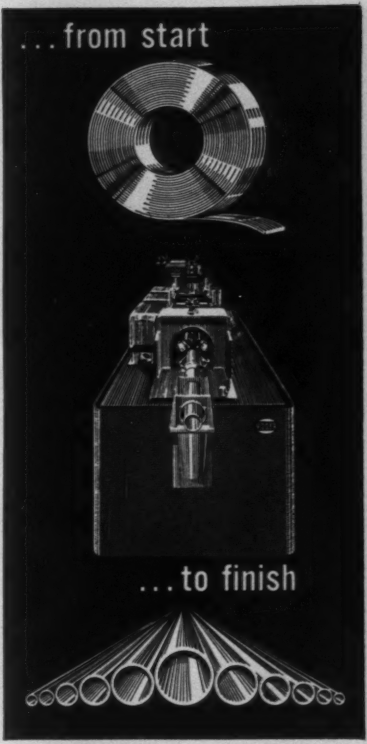
Instrument Society of America—Annual meeting, Jan. 23-25, Hotel Astor, New York. Society headquarters, 313—6th Ave., Pittsburgh.

Society of Plastic Engineers, Inc.—Annual technical meeting, Jan. 24-27, Shoreham & Park Sheraton, Washington, D. C. Society headquarters, 65 Prospect St., Stamford, Conn.

Cutting Tool Manufacturers Assn.—Annual business meeting, Jan. 26, Harmonie Club, Detroit. Association headquarters, 1216 Penobscot Bldg., Detroit.

National Assn. of Secondary Material Industries, Inc.—Midwestern Div. regional meeting, Jan. 26, Statler-Hilton Hotel, Detroit. Association headquarters, 271 Madison Ave., New York.

Truck-Trailer Manufacturers Assn., Inc.—Annual convention, Jan. 29-Feb. 1, Hollywood Beach Hotel, Hollywood, Fla. Association headquarters, 710 Albee Bldg., Washington, D. C.



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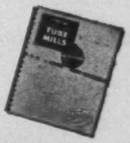
A Yoder engineer can help you realize remarkable savings in the manufacture of ferrous or non-ferrous pipe or tube. He can show you how present Yoder Pipe or Tube Mill owners are increasing production, lowering over-all manufacturing costs and reducing downtime through use of Yoder Mills.

If your products require pipe or tubing from 3/16" to 26" diameters, Yoder Pipe or Tube Mills and accessory equipment can help you produce your product more efficiently to meet today's competitive markets.

In addition to Pipe or Tube Mills, Yoder engineers and builds a complete line of Slitting equipment and Cold Roll-Forming Machinery.

For complete information on Yoder Tube Mills...send for the fully illustrated, 64 page Yoder Tube Mill book ...it is yours for the asking.



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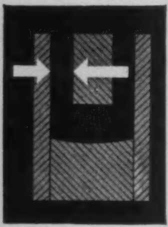
ENGINEERING YODER MANUFACTURING
PIPE AND TUBE MILLS
(ferrous or non-ferrous)

Control panel of a Carpenter consumable electrode (Consumet) furnace. Electronic circuits maintain positive arc control and precise electrode movement to assure the ultimate in refining.

Where *Carpenter's* "big inch" makes a mile of difference in alloy quality



The "big inch" in Carpenter's consumable electrode (Consumet®) furnace is the extra space between the consumable electrode and the mold wall. (Conventional furnaces of this type are almost ⅓ smaller at this vital point.) The "big inch" in Carpenter's furnace provides more exhaust space to carry off harmful gases. It also gives Carpenter technicians more precise vacuum control during the arc strike as well as during the entire melting process. As a result, you get cleaner, more uniform alloys from core to surface. Segregation and variation in grain size are minimized . . . to assure you consistent, predictable performance from your vacuum melted alloys. The "big inch" is only one of many exclusive Carpenter quality controls in consumable electrode, MEL-TROL® and vacuum-induction-melted (VacuMeltrol®) specialty steels. Ask your Carpenter representative for the full story behind these alloys and how they benefit you.

Carpenter steel

you can do it *consistently* better with Carpenter Stainless Steels for specialists

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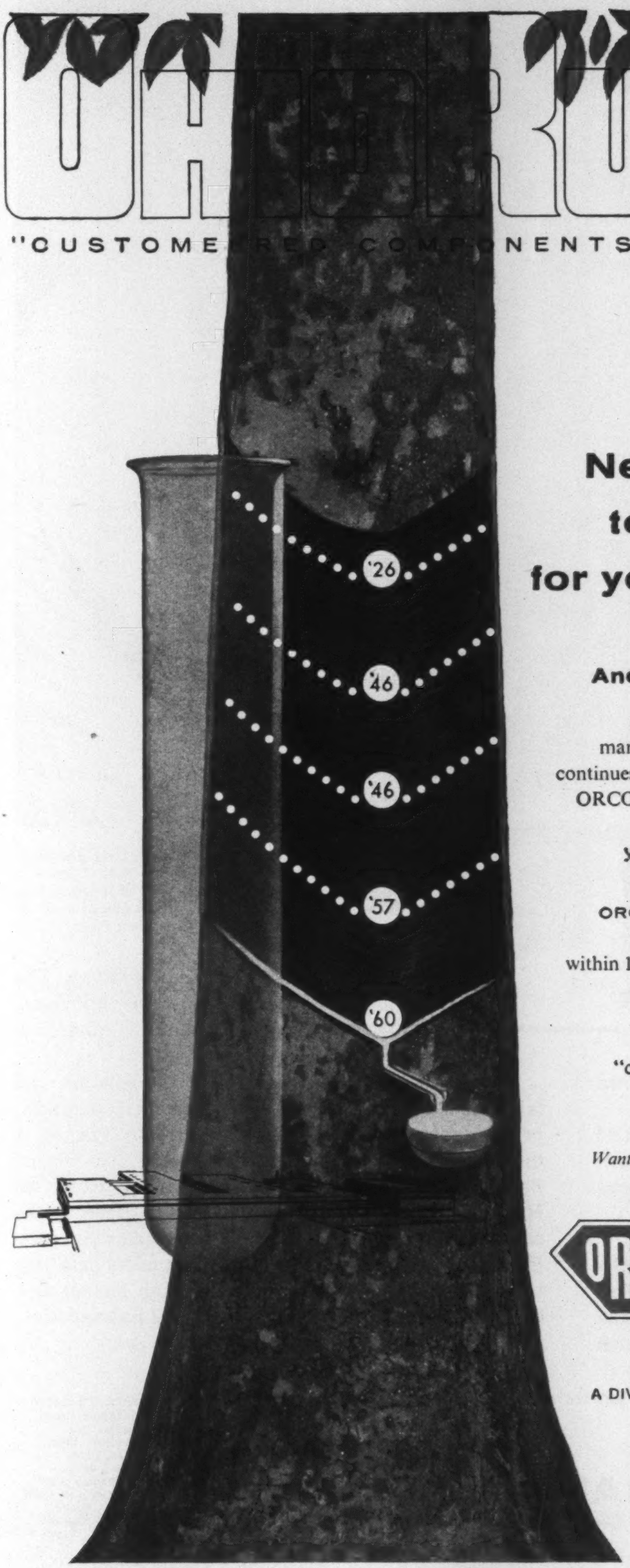
Carpenter Steel of New England, Inc., Bridgeport, Conn.

OHIO RUBBER

"CUSTOMEERED COMPONENTS BASIC TO INDUSTRY"



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And you made it possible!

Ohio Rubber's history of plant growth and manufacturing expansion dates back to 1926—continues through 1946 and 1957. And, in late 1960, ORCO opens its new Fort Smith, Arkansas plant—dedicated, as with the others, to serve you better—to supply your increasing needs for custom components.

ORCO SUM TOTAL: 5 major, geographically strategic plants . . . 1,200,000 square feet within 143 acres . . . over 2000 trained employees . . . diverse products of natural and synthetic rubber, neoprene, polyurethane, flexible and rigid vinyl . . . "customer-friends" like you across the board in industry, nationwide.

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MP-260

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A DIVISION OF THE EAGLE-PICHER COMPANY

EAGLE EP PICHER

Titeflex, Inc., Meets Aircraft Fuel, Lubrication and Hydraulic Line Specifications with

HANDY & HARMAN BRAZE 541

Titeflex operator brazes assembly with torch and hand-fed Handy & Harman Alloy BRAZE *541. Titeflex is unique in that it makes flexible hose assemblies from raw material to end product—"From End to End, Inside and Out, made RIGHT In Our Own Plant."*

This Springfield, Massachusetts, manufacturer of aircraft and missile fuel, lubrication and hydraulic lines finds that silver alloy brazing with Handy & Harman BRAZE 541 meets rigid operating requirements "all the way down the line."

The tubing and fittings of many of the wide range of assemblies made by Titeflex are 321, 316 and 347 stainless steel and Monel. Brazing is a hand torch, wire and HANDY FLUX operation.

BRAZE 541 is a plastic alloy which melts at 1325° F and flows at 1575° F. Its strength—in shear—at elevated temperatures is 21,500 psi at 500° F and 15,000 psi at 750° F. This alloy's ductility in resisting stress and vibration is very high and its resistance to oxidation and corrosion is equally impressive. The composition of BRAZE 541 is 54% silver, 40% copper, 5% zinc and 1% nickel. It meets AMS Specification 4772.

Aircraft and missile component manufacturers and fabricators are finding—to their and their products' benefit—that Handy & Harman silver alloy brazing is the full and *final* solution to their metal-joining problems. BRAZE 541 is but one of a large family of Handy & Harman alloys, for both low and high temperature applications. We would like to more fully acquaint you with BRAZE 541 and with the advantages that come naturally to silver brazing as a metal-joining (both ferrous and nonferrous) method. Handy & Harman, 82 Fulton Street, New York 38, N. Y.

FOR A GOOD START: BULLETIN 20

This informative booklet gives a good picture of silver brazing and its benefits . . . includes details on alloys, heating methods, joint design and production techniques. Write for your copy.

Your No. 1 Source of Supply and Authority on Brazing Alloys

HANDY & HARMAN

General Offices: 82 Fulton St., New York 38, N. Y.

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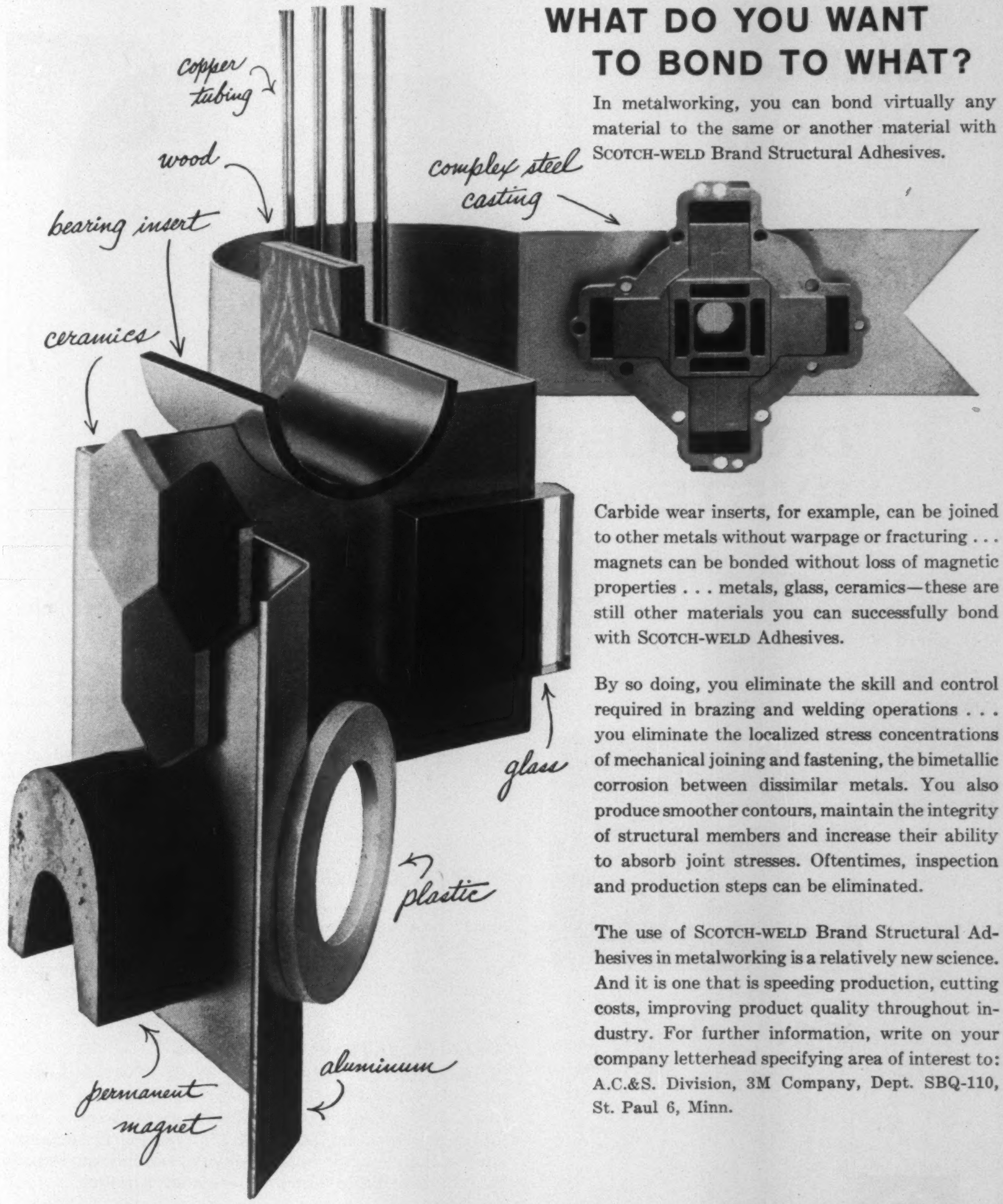
WHAT DO YOU WANT TO BOND TO WHAT?

In metalworking, you can bond virtually any material to the same or another material with SCOTCH-WELD Brand Structural Adhesives.



Carbide wear inserts, for example, can be joined to other metals without warpage or fracturing . . . magnets can be bonded without loss of magnetic properties . . . metals, glass, ceramics—these are still other materials you can successfully bond with SCOTCH-WELD Adhesives.

By so doing, you eliminate the skill and control required in brazing and welding operations . . . you eliminate the localized stress concentrations of mechanical joining and fastening, the bimetallic corrosion between dissimilar metals. You also produce smoother contours, maintain the integrity of structural members and increase their ability to absorb joint stresses. Oftentimes, inspection and production steps can be eliminated.

The use of SCOTCH-WELD Brand Structural Adhesives in metalworking is a relatively new science. And it is one that is speeding production, cutting costs, improving product quality throughout industry. For further information, write on your company letterhead specifying area of interest to: A.C.&S. Division, 3M Company, Dept. SBQ-110, St. Paul 6, Minn.

ADHESIVES, COATINGS AND SEALERS DIVISION

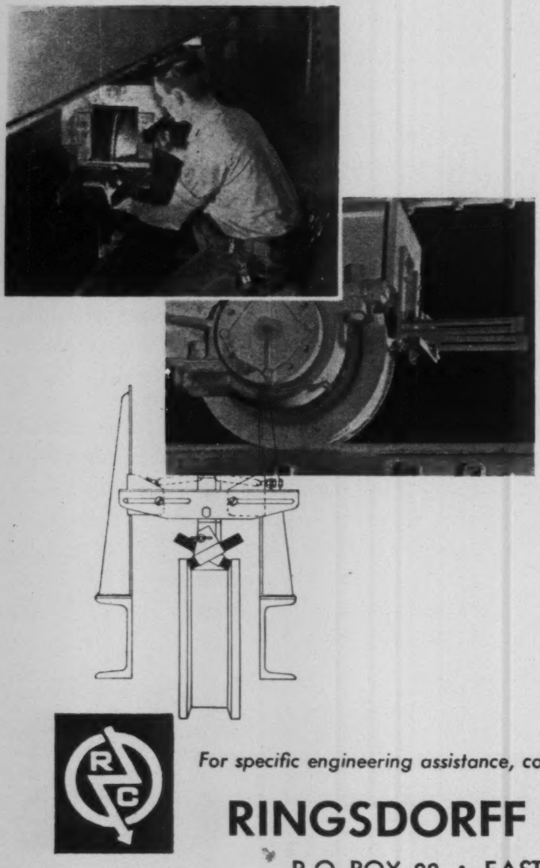
MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

a skilled worker for industry . . .

RINGSDORFF FLANGE WHEEL DRY LUBRICATION SYSTEM



REDUCES WEAR . . . CUTS MAINTENANCE AND OPERATING COSTS

Ringsdorff's new dry lubrication method makes it possible to considerably reduce wear and improve running behavior of cranes—therefore cutting down expensive maintenance and operating costs. There is no loss of traction . . . no wear due to accumulation of dust and dirt deposits in the lubricant.

PROLONGED WEAR

In multiple crane installations it is only necessary to equip one wheel on each side of the center crane . . . the film is transferred from flange to rail side to flange. Ringsdorff's Dry Lubrication System prolongs the life of wheels and flanges, decreases maintenance costs and prevents costly "down-time."

RINGSDORFF "D-4"

Ringsdorff developed graphite, grade "D-4" with lubricating properties inherent in carbon. It forms a smooth, hard lubricating film over wheel flange surfaces . . . does not cause loss of traction. "D-4" is available in rectangular rod form to fit the holding device, which is universally adaptable to fit traveling crane undercarriages.

For specific engineering assistance, contact:

RINGSDORFF CARBON CORPORATION

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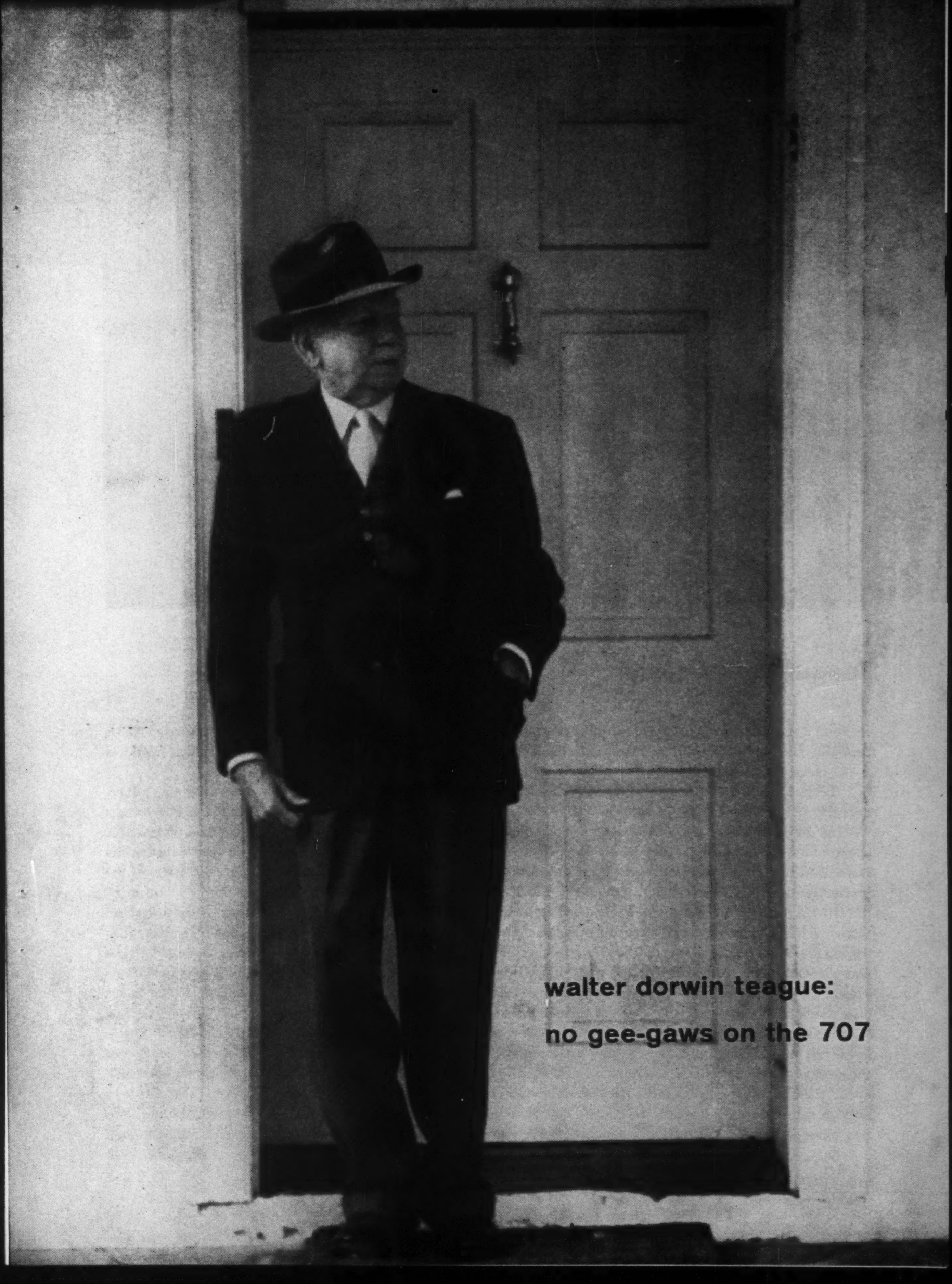
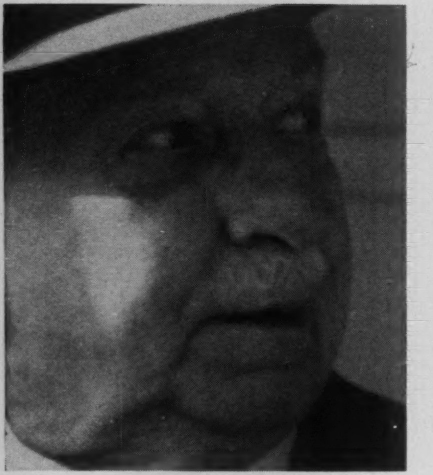
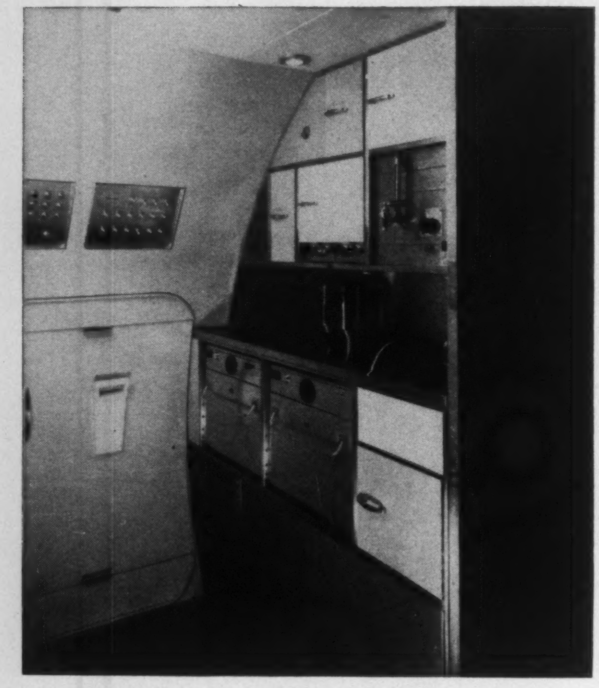


walter dorwin teague:

no gee-gaws on the 707





teague talks design

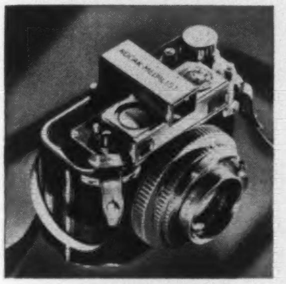
In 1942 a man named Walter Dorwin Teague published "You Can't Ignore Murder," a mystery novel. It is probably the only attempt at bafflement in his long history, because Walter Teague has been making products speak clearly for themselves since the Twenties.

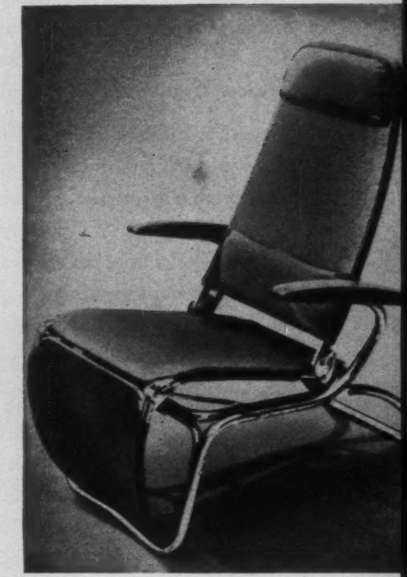
Teague has rightly been called the dean of industrial design. He began as an artist in 1908 designing advertising, books and magazine illustrations. If you're old enough to remember Locomobile and Pierce Arrow ads, Teague designed them. In 1927, Eastman Kodak asked him to redesign their cameras. He made a proposal to spend one week a month in their plant observing production problems and techniques, and *then* redesign the cameras. That simple principle of knowing how a product is made, of understanding all the complexities of the production line, is still a Teague trademark. And Eastman Kodak is still a Teague client.

In the thirty-plus years since that camera assignment, Teague has explored just about every nook and corner of the wonderful world of three dimensions. He designed the classic Marmon 16 automobile in 1930, with his son as collaborator; he was on the Design Board of the 1939 World's Fair. When World War II exploded, the Navy asked Teague to perform design work on their 16-inch guns in order to eliminate possibilities of explosions caused by loading malfunctions. Today he still works for the Bureau of Ordnance. He has 120 people in his organization, a branch in San Juan and task forces scattered across the United States

Teague has designed service stations, railway equipment, plane interiors, heating appliances, business machines and machine tools, offices and furniture, showrooms and department stores, even periodicals. One of the most impressive things he has done is the Boeing 707 jet interiors. Mr. Teague recalls: "Boeing was concerned about their ability to sell the 707 because they hadn't made civilian planes for years. We convinced them to build a full-size mockup of the interior. They gave us *carte blanche* with body engineers to collaborate, and they refused to look at it until it was finished. We made it complete to the tiniest detail. It cost half a million

S S PIERCE
S S PIERCE





dollars and helped in selling most of the huge fleet now in the air. Our staff is responsible for the final interiors of the planes purchased by eighteen or more airlines, and for the interiors of executive planes purchased by the United States Government."

Whether mammoth jet airliners or chairs, a product is designed to five principles that are the *modus operandi* of the Teague organization. "First of all, the redesigned product has to work better for our efforts," Teague says. "It should be more convenient to use, more humanized. It must make honest use of the material it's made of, and it's got to be capable of being efficiently manufactured at the proper price. We assiduously avoid gee-gaws or extraneous ornamentation that adds nothing but price to the product. Finally, the design must give the user an emotional pleasure or gratification each time it is used." Selection of the right material for the job is important to each of Teague's requirements. "We endorse no material over another," Teague says. "We first look for the material that is best in keeping with the product's desired personality. Strength and durability are highly important in material selection. Then we make sure our client's tooling can handle the material we have in mind. Above all, it takes the right material to sell the product to the consumer."

Teague has used practically all materials known to man and it is no accident that a great many of his designs use steel in one way or another. "The wonderful thing about steel is its versatility," says Teague. "Its many alloys, old and new, give it adaptability that other materials don't have. Its strength, both in tension and compression, qualifies it for literally thousands of uses. And stainless steel is another reason why steel is a modern metal because it gives so many designs their contemporary look."

The moral is this: steel is an ageless metal, as much at home in the Boeing 707 and today's elegant tableware as it was in medieval days. Its enduring modernity will always be recognized and used by designers like Walter Dorwin Teague.

USS United States Steel

TRADEMARK

designing with stainless steel

The ideal design has been described as one in which the properties of the material are fully utilized in the finished product. This ideal is difficult to achieve, and no group of materials comes as close to permitting this ideal as stainless steel.

To put it differently, no other material combines so many outstanding properties as the stainless steels. Stainless steels have high tensile strength. All are hardened and made even stronger by cold working. As a family they offer superb resistance to the corrosive effects of an enormous variety of reagents. They have unusual resistance to high temperature oxidation, and are distinguished by relatively low heat conductivity. And on top of their remarkable physical properties, stainless steel's lustrous appearance and sales appeal scarely need mention.

The history of stainless steel's use is marked by designers who turned a healthy profit with a quality material but mainly with sound ideas. They're the men who used stainless for its strength and sales appeal in toaster covers, its appearance and machinability in wrist watches, its structural properties and cleanability for truck trailer parts. Stainless steel cuts weight and adds years to the life of architectural panels; its corrosion resistance and smooth, pocket-free surface have made it the standard of the dairy industry. There are literally thousands of applications of stainless steel in which designers have utilized one, two or more of the remarkable properties of stainless steel.

Good design is honest design, whether it uses stainless steel or other materials. Yet the fact remains that there is no other commercial material quite as versatile as stainless steel. The applications shown on these pages are just a few of the hundreds of uses to which stainless is put every day. To learn more about stainless steel and its design properties, call our nearest sales office or write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

Stainless steels represent but a few of the thousands of grades of steel in existence today. United States Steel makes a complete line of stainless steels as well as alloy, high strength and carbon steels. Bring your design problems to us.

USS is a registered trademark

USS United States Steel

There are over 30 types of stainless steel today.

By reflecting the color of its surroundings, stainless steel contributes to harmonious design.

Types 302, 410 and 430 make up 75% of stainless steel's uses.

Successful designers don't substitute stainless steel sections for sections of other materials. They design to stainless' unique properties.

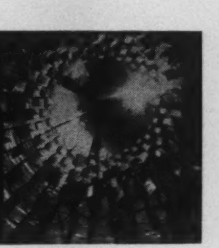
Good design doesn't stop with function and sales appeal. It must also be capable of economical manufacture. As a comprehensive guide, send for the free book described at the right.

No Material comes close to stainless steel's versatility. By way of illustration, here are a few "opposites" that prove our point.

HOT. Temperatures in a jet afterburner reach 1400°F.

COLD. Stainless heat exchanger operates at temperatures as low as —443°F.

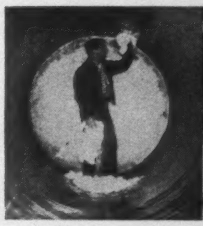
WET. Combination of moisture and coal would corrode nearly anything but stainless.



DRY. Rotary dryer is used to dry pharmaceutical ingredients.

CLEAN. Milk dispensers of stainless steel prevent contamination.

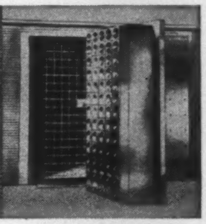
DIRTY. Stainless piston rings resist high temperature corrosion.



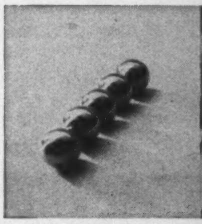
INSIDE. Chemical tanker needs simple wash-out for cleaning.

OUTSIDE. Stainless automobile trim stays bright and good-looking.

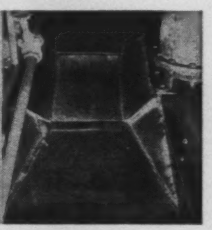
LIGHT. Stainless steel jewelry has a light, graceful appearance.



HEAVY. Strength and hardness of stainless combine to make safe doors safe.



ROLL. Stainless ball bearings take a lot of punishment.

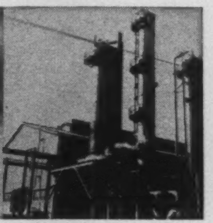


SLIDE. Abrasion resistance of stainless steel makes chutes last longer.

FORM. Stainless steel wrist watch keeps time and beauty.

FUNCTION. Stainless steel muffler defies heat with silence.

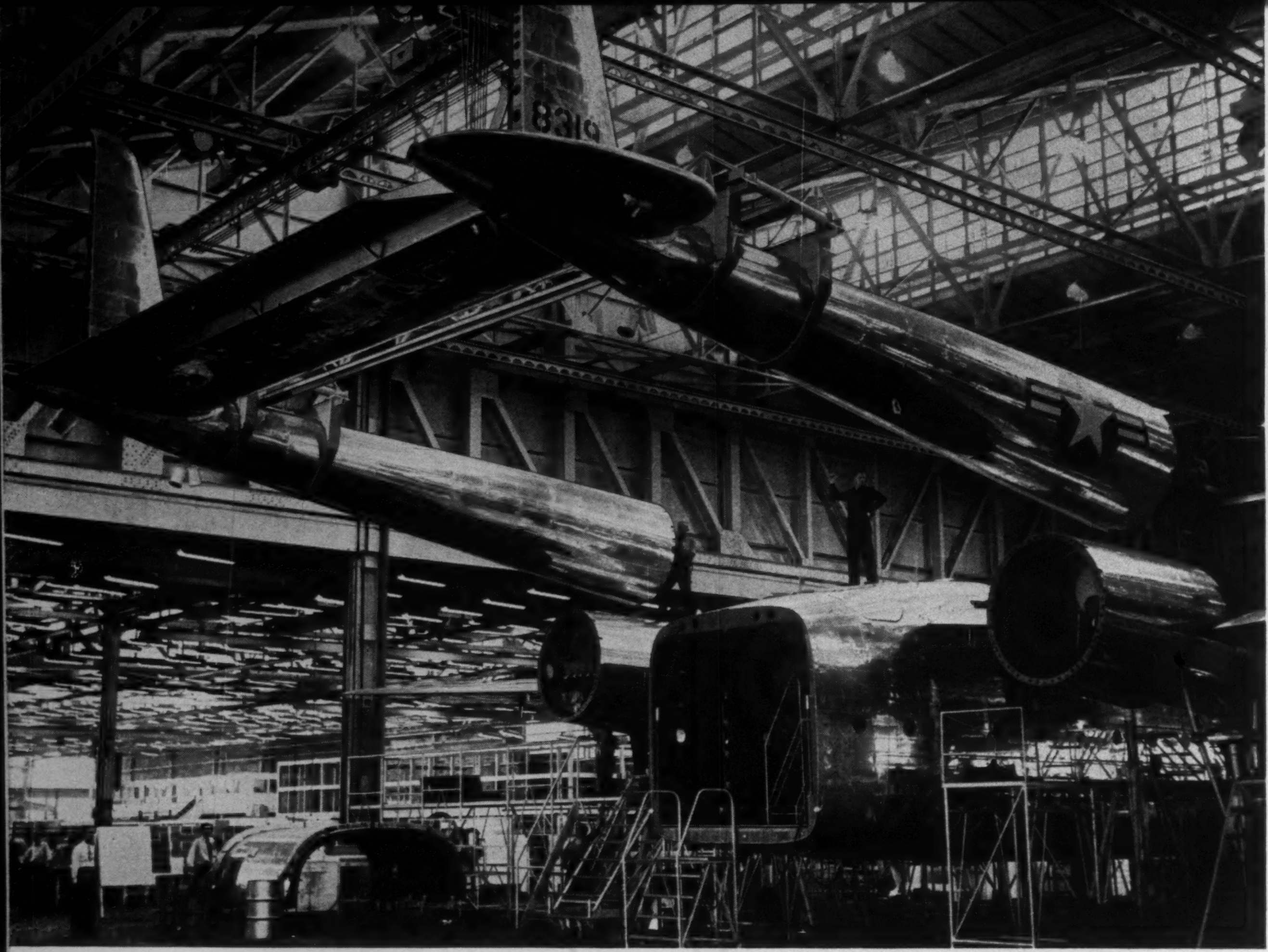
WATER. Stainless sinks stay bright and beautiful.



FIRE. Stainless steel shingles inside cat crackers are red hot.

Stainless Steel

This mark tells you a product is made of modern, dependable Steel.



▲

20 TON CRANES FLY AIRCRAFT SECTIONS IN CEILING

Lowering the tail boom of a large airplane into place. These huge units must be handled with extreme care and inched gently into exact position for matching of holes. The Cleveland Tramrail cranes used here are of the transfer type and carry loads to 20 tons.

40-FOOT TUBES HANDLED FAST IN CEILING

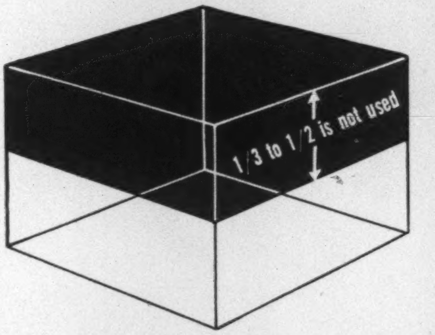
5 ton Tramrail cab-operated transfer cranes move tubes at 300 f.p.m. to all points in this 58,000 sq. ft. room. To convey the tubes from bay to bay with floor trucks would be awkward, slow and require considerable valuable floor space. The two hoist hooks are 16 feet apart and have a lift of 30′-0″.

▼

LOOK TO YOUR CEILING

For Big Savings

1/3 to 1/2 the cubic space in the average plant is NOT USED



MANY plants are pinched for floor space, yet are not using a large part of their cubic footage. Much of their large ceiling space is wasted.

By moving all equipment and activities possible from floor to ceiling, many square feet of floor are freed for the addition of production machinery without plant expansion for needed storage areas and other requirements.

Aisleways can be reduced in size or completely eliminated. Machines can be moved closer together. Floor areas used for local stocking can often be done away with.

Materials handling is an operation that can be carried on efficiently overhead. Cleveland Tramrail equipment is handling vast tonnages of materials in the ceilings of thousands of factories and warehouses. Not only do Tramrail cranes and track systems save tremendous areas of floor space, but they speed handling, lower production costs, often by fantastic amounts, and greatly aid safety.

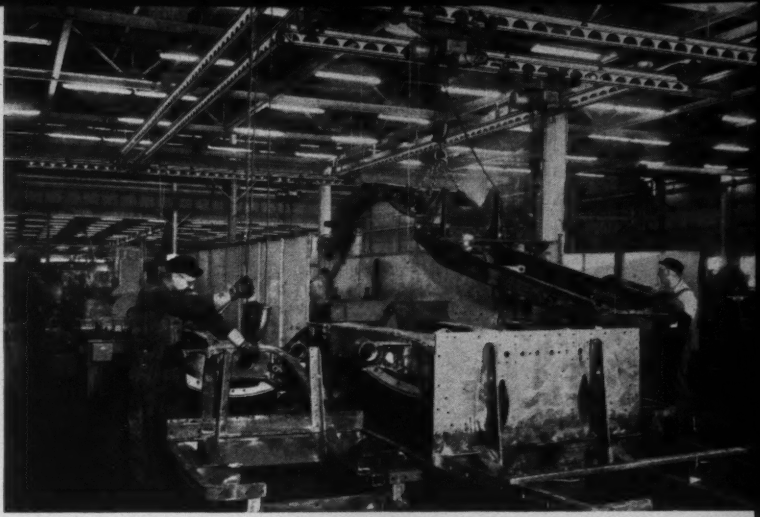
We welcome an opportunity for a Cleveland Tramrail materials-handling engineer to give you the details.

Write for free Engineering and Application Booklet No. 2008. Packed with valuable information.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

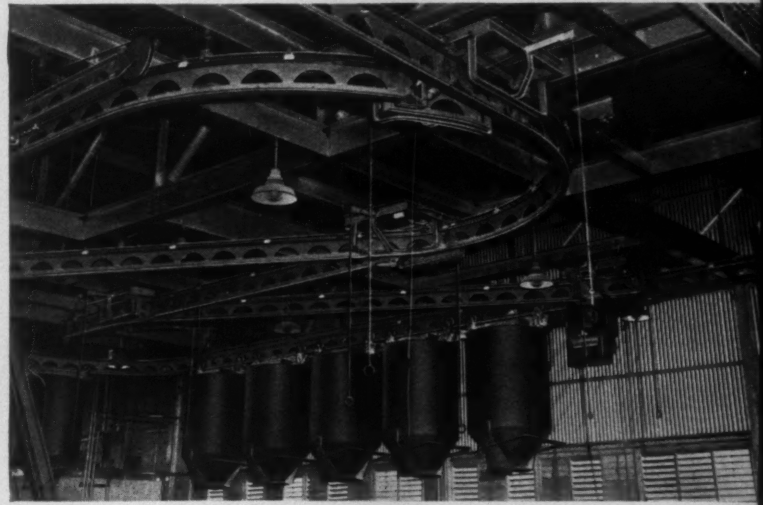
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
4832 E. 290 ST. • WICKLIFFE, OHIO



TRACTOR PLANT PROFITS BY USING CEILING

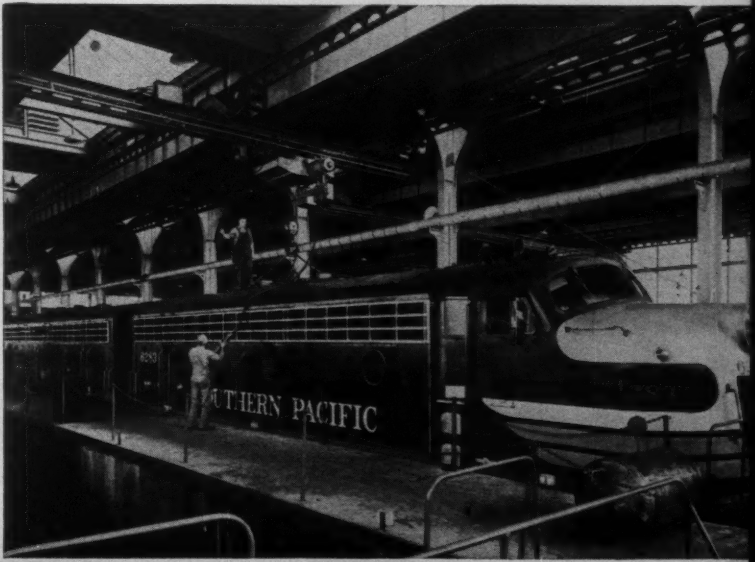
Heavy materials can be moved quickly, easily by one man in every square foot of a plant covered by Cleveland Tramrail cranes.

Some 250 cranes, like those illustrated, eliminate waste time waiting for a lift in this efficient plant.



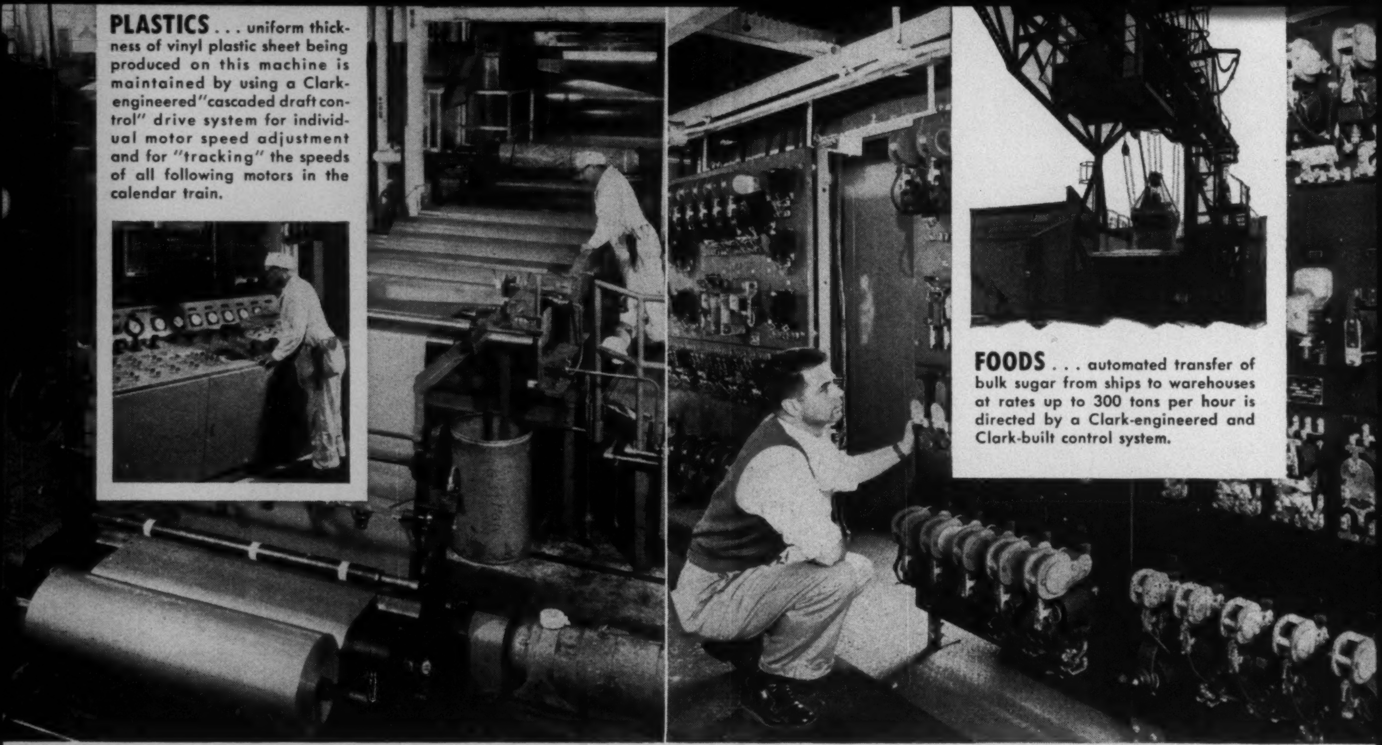
TRAINS OF BUCKETS CONVEYED IN CEILING

Buckets of materials can be conveyed on Tramrail track and switch system in ceiling by powerful tractor. Control can be automatic if desired. Each bucket in train illustrated has 45 cu. ft. volume and 4000 lb. capacity.



TRAMRAIL CRANES PERMIT LOWER HEIGHT OF CEILING

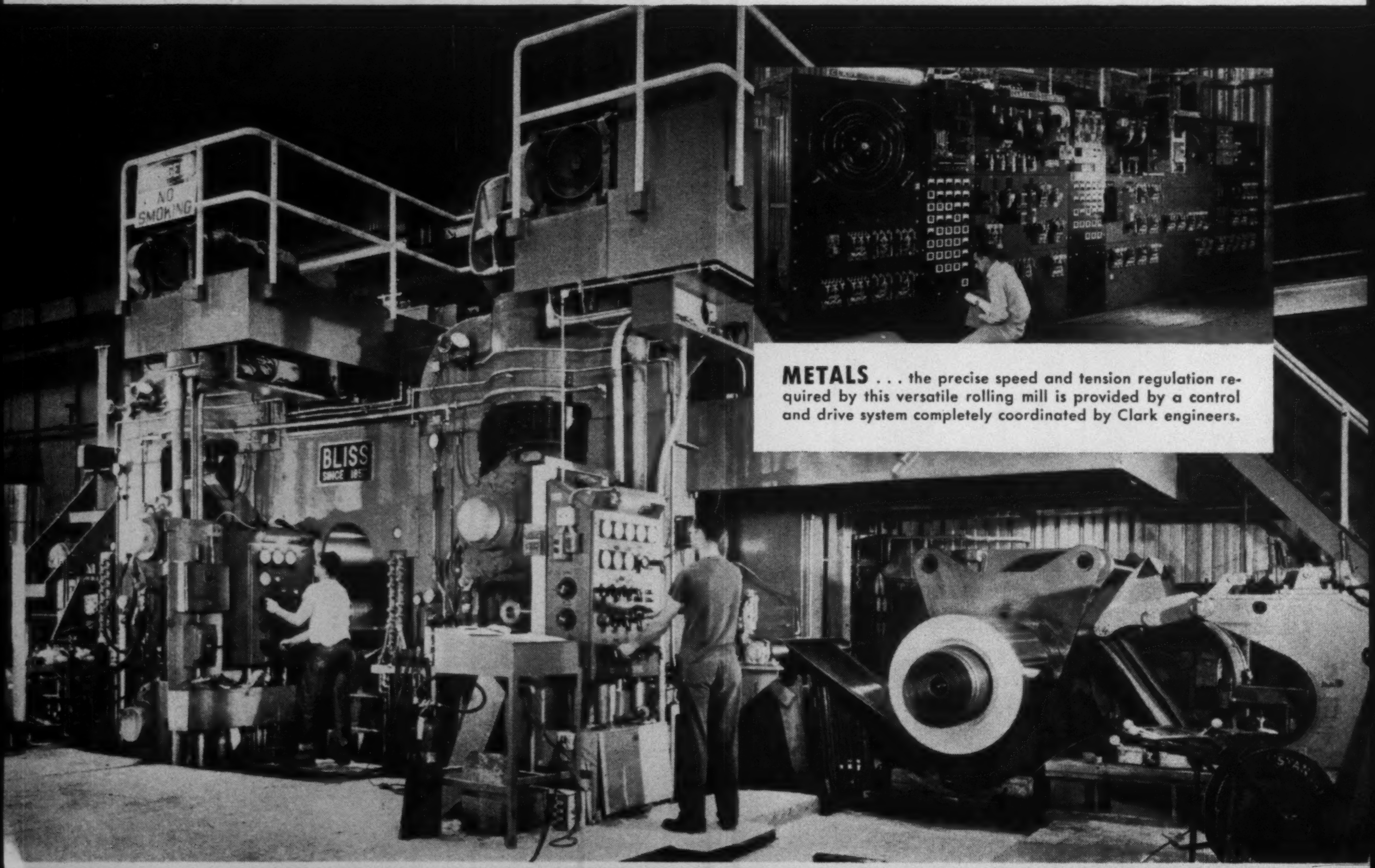
Both ordinary top-running and Tramrail under-running cranes were considered when this Diesel Repair Shop was planned. Two 5 ton, 63′-0″ Cleveland Tramrail cranes were installed. Among other advantages, they enabled a lower building height. This shop is thought to be the finest and most modern of its kind.



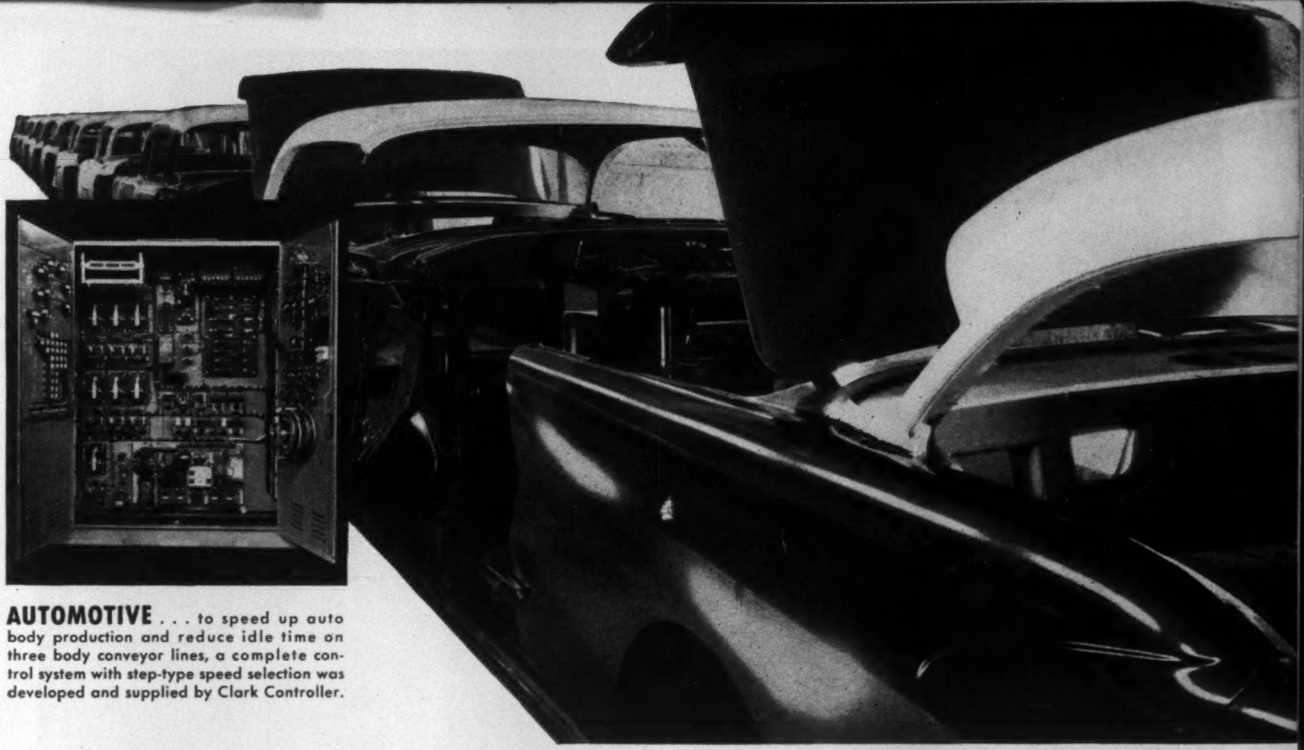
PLASTICS . . . uniform thickness of vinyl plastic sheet being produced on this machine is maintained by using a Clark-engineered "cascaded draft control" drive system for individual motor speed adjustment and for "tracking" the speeds of all following motors in the calendar train.

FOODS . . . automated transfer of bulk sugar from ships to warehouses at rates up to 300 tons per hour is directed by a Clark-engineered and Clark-built control system.

How to get the most from



METALS . . . the precise speed and tension regulation required by this versatile rolling mill is provided by a control and drive system completely coordinated by Clark engineers.



AUTOMOTIVE . . . to speed up auto body production and reduce idle time on three body conveyor lines, a complete control system with step-type speed selection was developed and supplied by Clark Controller.

your machines and processes

Automatic control is the most vital element in today's automated processes, systems and machines.

Clark engineers are specialists in automatic controls, and Clark's control equipment—relays, contactors, push buttons, control centers, etc.—is designed with a thorough knowledge of specific industry requirements.

Clark is therefore ideally qualified to furnish complete coordinated control and drive systems.

Perhaps this great combination of product and experience can help you directly. It makes no difference what industry or type of production machinery or process. More and more automation-minded manufacturers everywhere are turning to Clark for completely coordinated control engineering service and equipment.

From concept to start-up, Clark engineers work as partners with engineering and manufacturing personnel, consulting engineers, contractors, and equipment manufacturers. We welcome the opportunity to show you how they can work for your particular advantage. For more information, contact your nearest Clark Controller sales office. Or, write direct.

60 A1

The
CLARK CONTROLLER
Company

"Everything Under Control"

Main Plant: *Cleveland 10* • **Western Plant:** *Los Angeles 58*
In Canada: *Canadian Controllers, Limited, Toronto*

What in blazes can't B.F. Goodrich hose stand

How an improved kind of hose keeps furnace doors from melting

IT'S 3000 degrees hot inside those open hearth furnaces. So hot that the heavy steel doors would melt in minutes except for the hose that carries a stream of cooling water in and out of them.

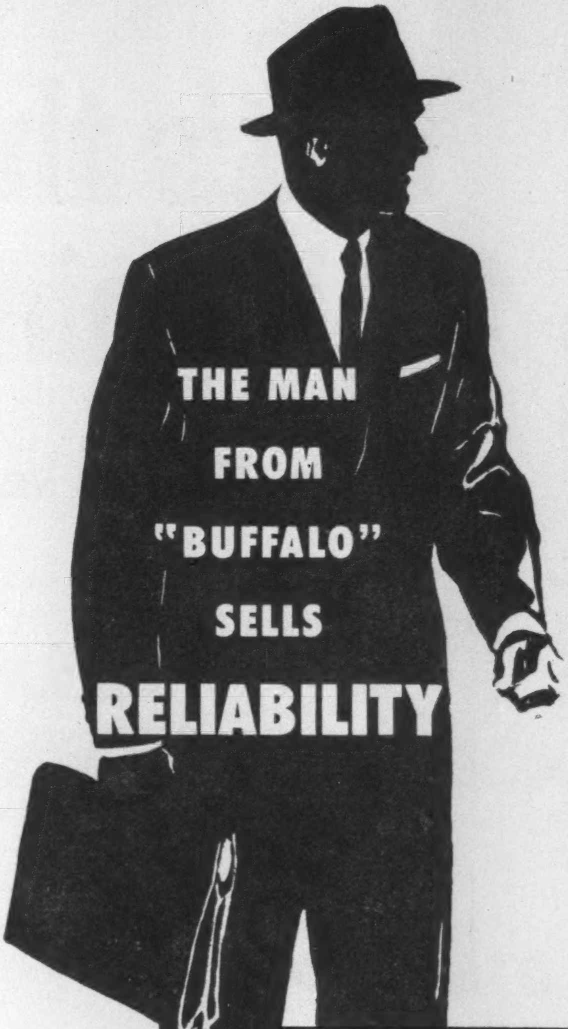
Trouble was that the hose used to burn out after only 2 or 3 weeks. White hot blasts of heat cook it. Hot metal spatters it. Often big "charging machines" bang into it.

The B.F. Goodrich distributor, servicing the steel mill, asked what we could do to solve this problem. BFG engineers designed, tested, rejected—finally developed a rubber hose, wrapped with asbestos for heat resistance, armored with braided stainless steel wire for strength.

Where other more expensive hose burned out in a matter of a few weeks, the B.F.Goodrich hose is good for *3 or 4 months* of constant use. What's more, the improved BFG hose is much lighter, more flexible, easier for workmen to handle. One man can install it where two were needed for other hose.

B.F.Goodrich makes hose to carry almost anything—from blasts of air to torrents of water; for scalding steam, corrosive chemicals, abrasive sand. Any one of our BFG distributors can explain the different types of hose we make, tell you what to expect from each, help you decide which is your best buy. *B. F. Goodrich Industrial Products Co., Dept. M-916, Akron 18, Ohio.*

B.F.Goodrich



You Can Rely on the Air Handling Products He Sells . . . for effective, efficient and economical service because they are correctly designed and made of quality materials.

You Can Rely on the Services He Offers . . . because he is a specially trained engineer backed by over 83 years of fan engineering and production experience.

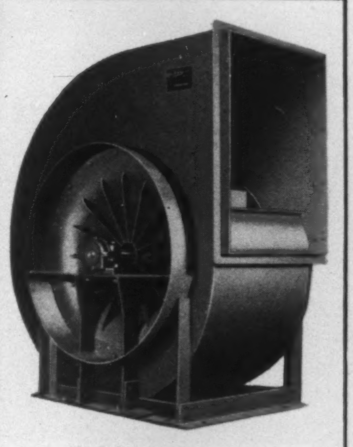
Note the quality features built into the two "Buffalo" Fans on this page. This is the kind of superior construction that insures complete reliability.

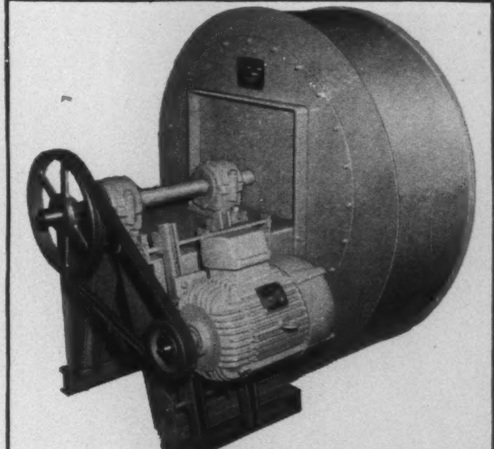
"Buffalo" Industrial Exhausters — the rugged construction of these efficient air and materials handling fans includes heavy steel plate housing, welded throughout. These units are widely used in steel mills, cement plants and similar severe applications. Models are available for moving hot gases from 200°F. to 850°F. In corrosive fume installations, "Buffalo" Rubber-Lined Exhausters outlast metal fans up to twelve to one. These units may be ordered with material wheels for efficiently moving abrasive dust, saw dust, chips, long shavings and a variety of other "problem" materials. For complete facts, write for Bulletin FI-110.

"Buffalo" Type "BL" Fans — These durable fans are designed for peak performance in all Class I and II air moving jobs. Ideal for ventilating, air conditioning and air cleaning systems. The heavy gauge housings are of all-welded construction. Structural steel bracing provides stiffness and rigid bearing support. Hot-rolled or forged shafts are precision made for perfect wheel and bearing fit. Husky backward-curved blades are welded to solid shroud and back-plate. Self-aligning anti-friction bearings assure continuous dependable operation at maximum tip speed. Write for Bulletin F-104.

Whatever your air handling needs, call in "The Man From Buffalo" . . . your nearby "Buffalo" Engineering Representative. He'll help you be sure you have the right fan for the job. And when it's a "Buffalo" Fan, you can depend on its reliability.

"Buffalo"


"Buffalo" Type "BL" Fan


"Buffalo" Industrial Exhauster

BUFFALO FORGE COMPANY

Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

'Buffalo' Air Handling Equipment to move, heat, cool, dehumidify and clean air and other gases.

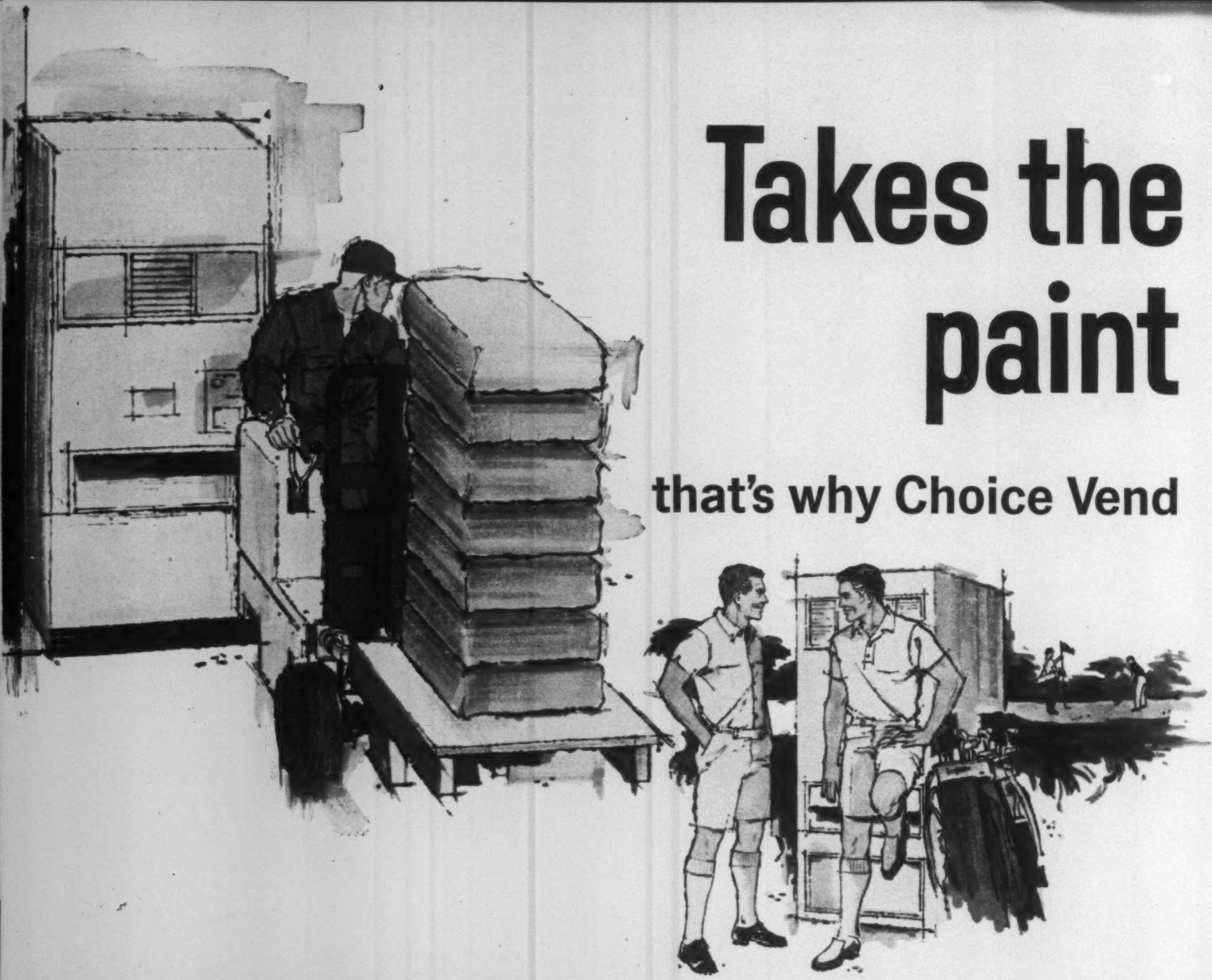
'Buffalo' Machine Tools to drill, punch, shear, bend, slit, notch and cope for production or plant maintenance.

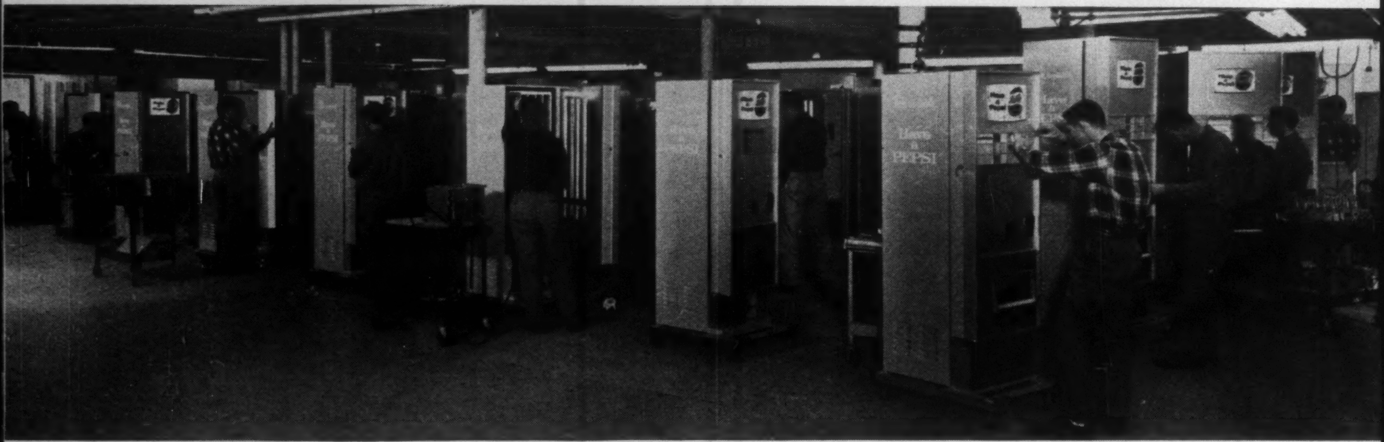
'Buffalo' Centrifugal Pumps to handle most liquids and slurries under a variety of conditions.

Squier Machinery to process sugar cane, coffee and rice. Special processing machinery for chemicals.

Takes the paint

that's why Choice Vend





This STEELMARK of the American Steel Industry tells you a product is made of steel. Look for it when you buy. Place it on the products you sell.

FINAL ASSEMBLY OPERATION. Choice Vend Division, Seeburg Corp., Hartford, Connecticut. Before assembly, parts receive a primer coat and an infrared baked-on finish coat of paint. Electro Paintlok's superior paint-gripping characteristics insure a tight bonding of paint to metal, and its smooth, non-spangled surface helps achieve a lustrous, attractive painted finish.

knocks... stays tight

uses Republic Electro Paintlok Steel Sheets

The modern straight-line design of Choice Vend's soft drink vending machines makes them attractive in any setting. How to keep them that way was the problem, since machines placed in public locations are subject to all kinds of bumps and knocks.

Choice Vend found the answer in Republic Electro Paintlok® Steel Sheets. Electro Paintlok has the strength and rigidity to withstand severe service and it holds paint tight to keep machines new-looking longer.

FIRM MECHANICAL BOND. Electro Paintlok Sheets are zinc coated by the electrolytic process, then chemically treated to provide an inert phosphate surface film. Result: a firm mechanical bonding of paint, lacquer or enamel to the steel.

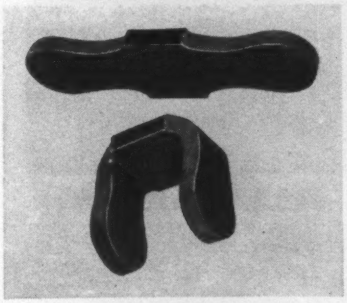
For information on advantages of Republic Electro Paintlok for your products mail the attached coupon. Electro Paintlok is available in widths to 60 inches, thicknesses from .0088 to .1083 inches, coils or cut lengths.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

CENTURY SERIES C-1144 Distributor Shaft
CENTURY SERIES C-1141 Hoist Support Shaft
CENTURY SERIES C-1151 Electric Motor Shaft
CENTURY SERIES C-1050 Axle
CENTURY SERIES C-1045 Shaft

TRIM COLD FINISHED BAR COSTS. Republic's CENTURY SERIES offers five different grades of high-strength, stress-relieved, cold finished bars, each having a minimum yield strength of 100,000 psi. Selecting the grade with just the right degree of machinability and toughness for your job requirements can mean sizable savings in material costs. For highly machined parts — C-1144. Moderately machined parts — C-1140 or C-1151. For parts where machinabilty is a minor factor — C-1050 or C-1045. Send for free CENTURY SERIES Booklet for complete data.



RUGGED STRENGTH FOR PTO UNIVERSAL JOINT YOKES. Republic Type "M" High Strength Steel provides Alofs Manufacturing Corporation, Grand Rapids, Michigan, with a better, lower cost way to make tractor universal joint yokes. The part is stamped from ⅜″ x 1½″ Republic "M" High Strength Steel, and formed into a U shape. Result: important manufacturing savings over the previous manufacturing method, plus the toughness to withstand severe strain and impact. For more data on Republic High Strength Steels (offered in Types "M," "50," "65," and "70") send the coupon.

REPUBLIC STEEL CORPORATION
DEPT. IA-9837-A
1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO

☐ Please send free CENTURY SERIES Booklet
Send additional information on the following:
☐ Electro Paintlok® Sheets
☐ Republic High Strength Steels
☐ American Steel Industry STEELMARKS

Name__________ Title__________

Firm__________

Address__________

City__________ Zone_____ State__________

Alcoa pressure-bonds ALUMINUM TO STAINLESS for the advantages of both!

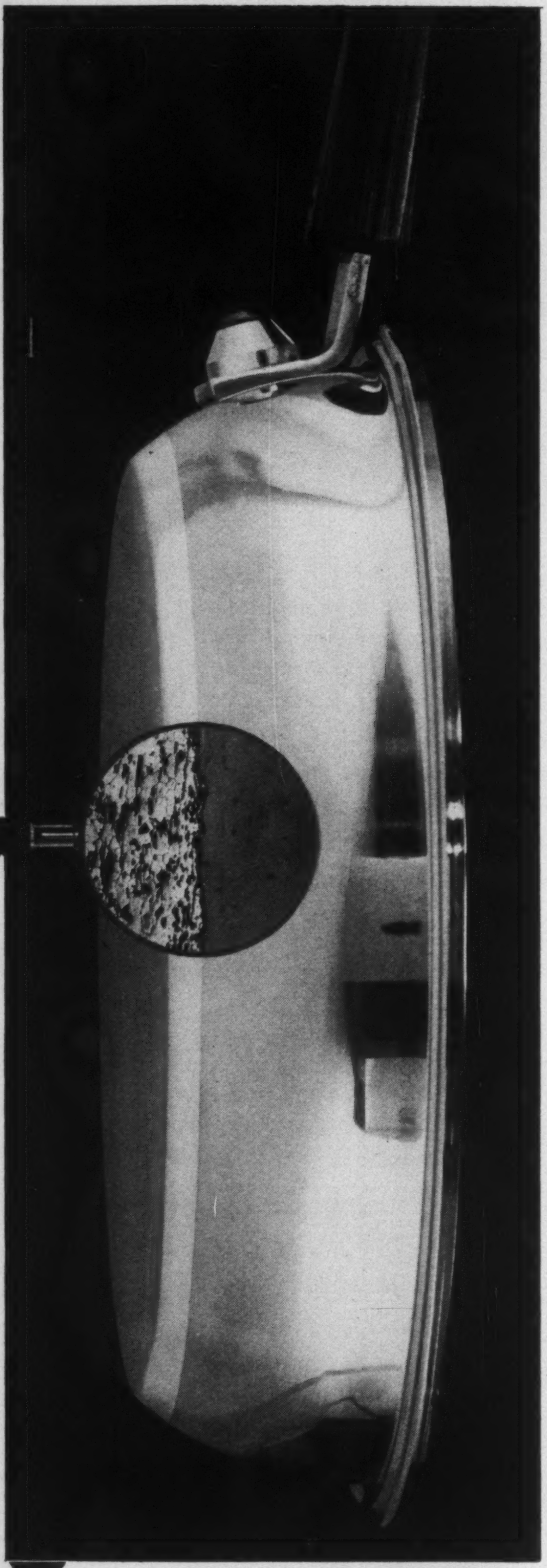
Buckeye Division of Mardigian Corporation designs fast, even heating—easy cleaning into its new "Cordon Bleu" cookware line

Alcoa pressure bonding inspired an entirely new line of quality cookware by the Buckeye Division of Mardigian Corporation. "Cordon Bleu" gains the advantages of *both* metals: aluminum's high conductivity, corrosion resistance and light weight; the strength and density of stainless.

Heat and pressure combine to adhere aluminum to stainless in a die without flux or molten metal. The result is a bond of strength, ductility and integrity.

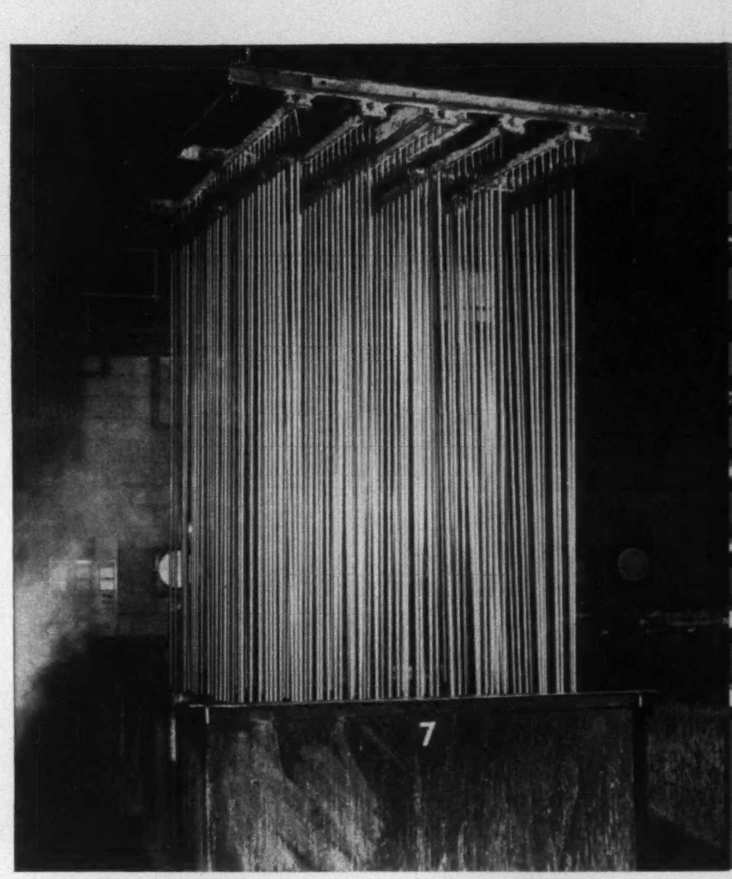
Alcoa's patented process forges many bimetallic unions: aluminum to carbon and alloy steels, to copper, to alloys of itself. Complex shapes are no longer a problem. Here disks cut from aluminum plate flowed up and around radii during bonding. Other processes start with cast aluminum slugs.

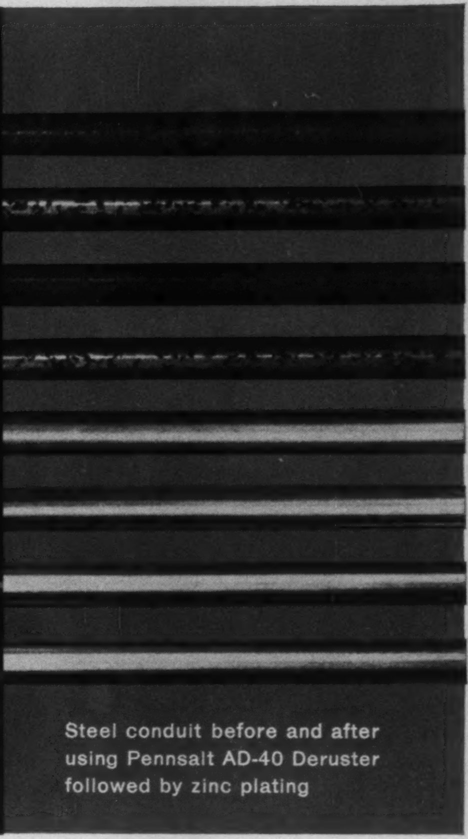
Design possibilities abound for this unique pressure-bonding technique. Want more data, design help, feasibility evaluation? Call on your nearest Alcoa sales office, or write: Aluminum Company of America, 907-L Alcoa Building, Pittsburgh 19, Pa.



ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA





Steel conduit before and after using Pennsalt AD-40 Deruster followed by zinc plating

New Pennsalt AD-40 removes rust . . . oxidation . . . heat stains . . . burnt-on oil . . . smut . . . paint

Here's another new Pennsalt product to help cut your metal finishing costs. It's Pennsalt AD-40 alkaline deruster—the faster, easier way to remove rust and oxidation from steel and stainless steel . . . to remove heat treating stains from stainless . . . and to remove zinc and iron phosphate coatings. AD-40—with built-in cleaning action—also doubles as a paint stripper and a replacement for acid in plating cycles on steel. Here's what you'll get with Pennsalt AD-40:

- Efficient rust and oxidation removal
- Non-electrolytic action—no electric current required
- No waste disposal problems—no cyanide content
- Self-contained detergent system that aids cleaning action
- 100% active, water-soluble powder—no filler or water
- Shorter, simplified work cycle

Ask your Pennsalt representative about new AD-40 alkaline deruster . . . and about the Pennsalt Metal Preparation Service Plan, which integrates chemicals, equipment and service to make your finishing dollars go farther.

Pennsalt Metal Finishing Equipment

Washers • Automatic coating machines • Automatic phosphatizing machines • Automatic pickling machines • Drying and finish bake ovens • Paint spray booths • Complete finishing systems

Pennsalt Metal Processing Materials

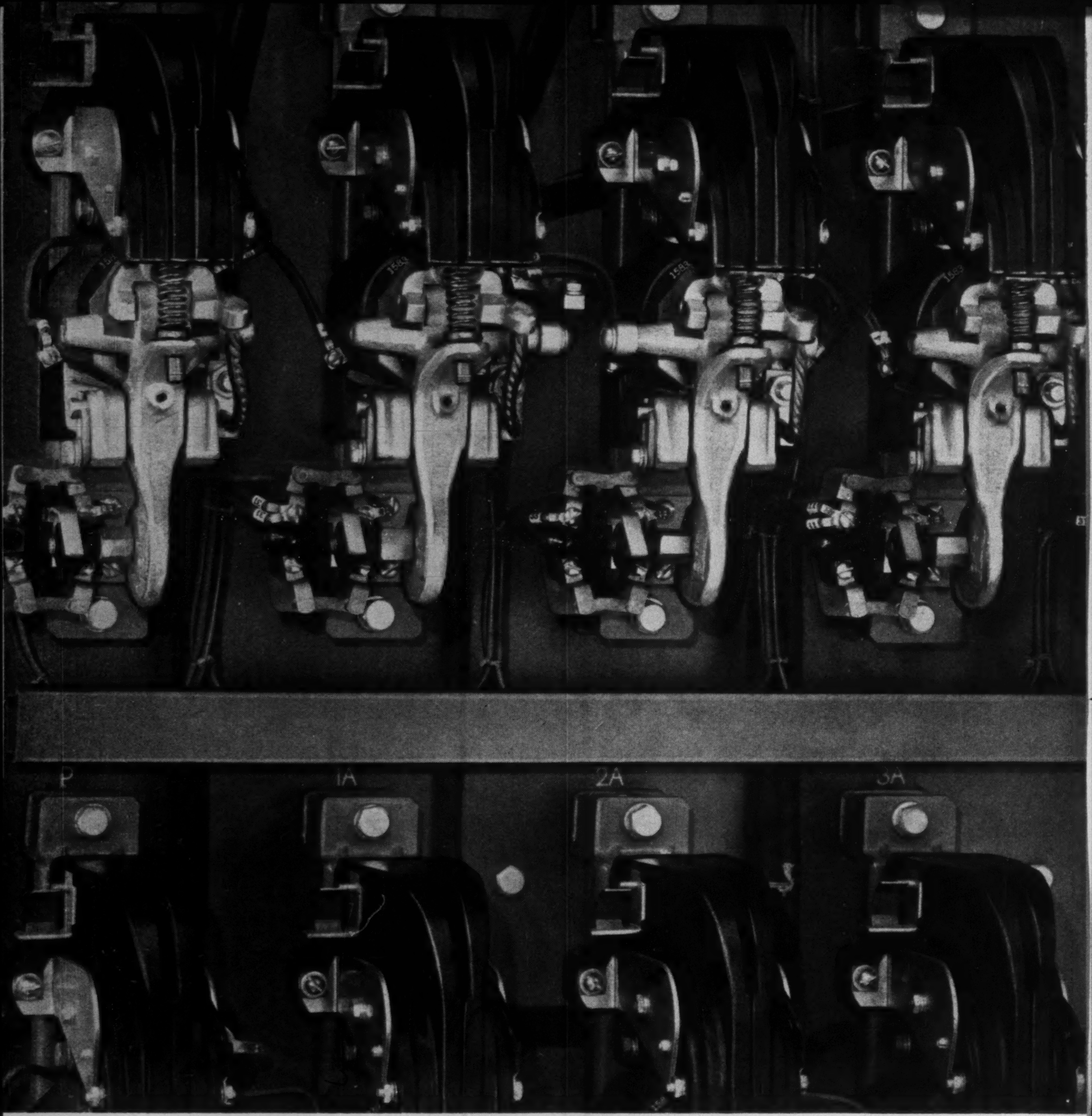
Cleaners for all metals • Etchants and brighteners • Descaling and pickling compounds • FOSBOND® phosphatizing agents • FOSCOAT® pre-lubricant coatings • FOSLUBE® drawing lubricants • DRAWCOTE® deep-drawing lubricants • Paint strippers and strippable vinyl coatings

. . . a better start for your finish®

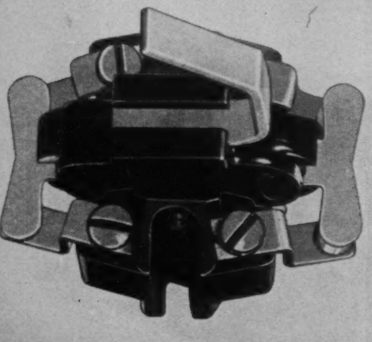
METAL PROCESSING DEPARTMENT
PENNSALT CHEMICALS CORPORATION
East: 3 Penn Center, Philadelphia 2, Pa.
West: 2700 S. Eastern Ave., Los Angeles 22, Calif.

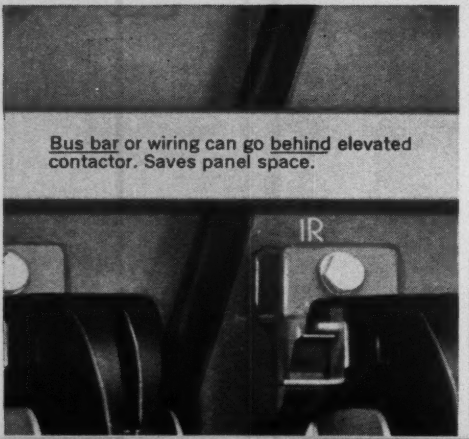
Pennsalt Chemicals of Canada Ltd., Oakville, Ont. • Industrial Química Pennsalt, Mexico City

Pennsalt Chemicals®
ESTABLISHED 1850

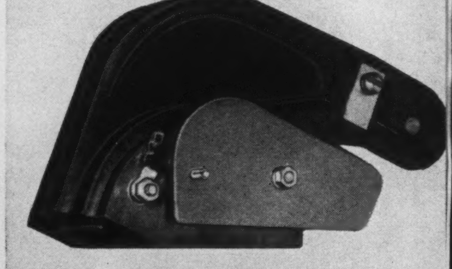


Pre-drilled mounting holes on unit base accommodate electrical interlock assemblies with field convertible contacts.




Bus bar or wiring can go behind elevated contactor. Saves panel space.

New improved arc chute increases contact life.



CONTROL

Now! More compact front wired control panels with new Cutler-Hammer D-c contactors!

Six sizes with new mounting flexibility for the control panel you need: 25, 50, 100, 150, 300, and 600 amperes

Cutler-Hammer's new line of D-c unitized contactors gives you the flexibility of mounting you need . . . in panels built for you by Cutler-Hammer or panels you assemble.

Every contactor is assembled on an insulated steel base, so all that's needed is two bolts to attach it to a steel or slate panel. Wire them from the back or from the front. Surface mount them or elevate them with spacers. Elevated mounting and front wiring give the ultimate in space saving and ease of maintenance.

This rugged new line has been thoroughly tested to give you the typical long-lived performance of all Cutler-Hammer control. Coils are impregnated with epoxy resin for complete protection against moisture and dust. Improved blow-out structure increases contact life even more.

What's new at Cutler-Hammer? The new line of unitized contactors is just another step to keep Cutler-Hammer your best source for heavy duty mill control equipment. Wherever you look you can see the new spirit—in new, better products, new manufacturing facilities, new engineering talent—all designed to serve you better in the big years ahead. Get all the facts about Cutler-Hammer. Ask your Cutler-Hammer distributor, Cutler-Hammer sales office or write direct for Pub. LO-80-W246 which tells about unitized contactors.

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

CONTROL

METALGRAMS

UNION CARBIDE METALS

. . . news about "Electromet" ferroalloys and metals

NOVEMBER, 1960

AN EFFICIENT BLOCK -- Why is silicomanganese the most popular blocking alloy in the steel industry today? It dissolves 50 per cent faster than separate silicon and manganese additions, giving faster blocks and shorter blocking times. Its low-carbon content allows higher tapping carbons, reducing furnace time and also aiding steel cleanliness. Since silicomanganese is a more powerful deoxidizer than straight silicon blocks, it gives tighter blocks that last longer. Finally, silicomanganese provides low-cost silicon and manganese, reducing blocking costs to a minimum.

* * *

BETTER CONTROL, TOO! -- Results of hundreds of open-hearth production heats show that a silicomanganese block gives better control of carbon content and alloy additions. Off-grade heats for carbon and manganese have been shown to be lowest for silicomanganese compared to a pig ferrosilicon or a 50 per cent ferrosilicon block. Also, silicomanganese gave a higher manganese recovery than other blocks when all the manganese was added to the furnace. For details, write for the article, "Silicomanganese Improves Blocking Performance," in the Fall 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

LOWER COSTS FOR STAINLESS STEEL -- Another manganese-silicon alloy -- ferromanganese-silicon -- is saving stainless steel producers thousands of dollars per year. Used for slag reduction and manganese additions, ferromanganese-silicon is replacing other low-carbon manganese sources. Savings per ton: $0.75 to $1.75 for type 300 stainless grades and $4 to $9 for type 200 grades. Some stainless producers have also found that ferromanganese-silicon produces cleaner steels. Write for F-20,093 for further information.

* * *

BUILDING BIGGER MARKETS -- "Your man's practically a member of my staff," a president of a steel firm said of one of UCM's market development specialists. These men work with steel producers to develop new markets and expand old ones. Primarily, they promote the use of stainless steel and titanium (including castings) in transportation, architecture, process industries, and consumer goods. More details can be obtained by writing for the article, "Men, Metals, and Markets," in the Spring 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

PRODUCTS WITH A SPLIT PERSONALITY -- Several "Electromet" alloys and metals are used in both metals and chemicals. Silicon metal -- an important alloy in aluminum and copper -- is a key raw material for silicones. Vanadium oxide -- used in tool and constructional steels -- is a catalyst in the production of adipic acid, sulfuric acid, maleic anhydride, and phthalic anhydride. It also gives special colors to glass and ceramics. Finally, "Elmang" electrolytic manganese -- high-purity manganese for stainless steel, deep-drawing steels, copper and aluminum -- is a catalyst for adipic, terephthalic, and acetic acids. Write for the article, "Products with a Split Personality," in the Spring issue of UNION CARBIDE METALS REVIEW.

* * *

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MARKET-PLANNING DIGEST

Metalworking Newsfront 6

CONSUMPTION OF METALS FOR DIECAST PARTS, now over 600,000 tons a year, has doubled in the last decade. This explosive growth is expected to continue through the next ten years, according to experts. The biggest plum would be capturing a major share of aluminum parts. One engineer for a major automaker predicts aluminum castings will consume 1.750 million lb of the light metal by 1970, a five-fold increase over 1960.

PURCHASING AGENTS HELP SELL. A number of purchasing men report there is a trend developing in which vendor salesmen often bring along their company purchasing agents on sales calls. Big national companies, as well as smaller companies, are using this "second salesman" approach. The approach is mostly used where reciprocal relations are involved.

EASIER MONEY IS NOT YET HERE. The November Morgan Guaranty Survey notes that despite Federal Reserve actions in the direction of easier money, "the market's response gives doubt as to whether substantially easier money is in the offing."

MATERIAL HANDLING EQUIPMENT BOOKINGS were down slightly in September from August. C. L. Fell, Material Handling Institute president, says plant expansion cutbacks caused the drop. But he notes that companies continue to buy cost-cutting equipment.

LONG-RANGE SALES FORECASTING FOR METALWORKING suffered a setback in 1960 in the Midwest. Sales of some companies were 25 pct off sales forecasts. Now, some area companies are developing new weighting factors for their forecasts. Some factor allowances: Expansion of Midwest industries overseas, less overseas sales by domestic plants, and more imports.

NEVER OVERLOOK A MARKET OPPORTUNITY, say market researchers. An almost novel case in point is in metal "tubes" used for roadside deliveries of newspapers. One aluminum maker has found a market in these tubes in areas where corrosion is a problem. The company is now looking for a widening of this market.

THE INDEX OF THE AMERICAN GEAR MANUFACTURERS ASSN. shows a 22.6 pct decrease in September from August. The September index was 197.9 (1947-49=100) for new bookings. This is well below the 1959 average of 234.7.

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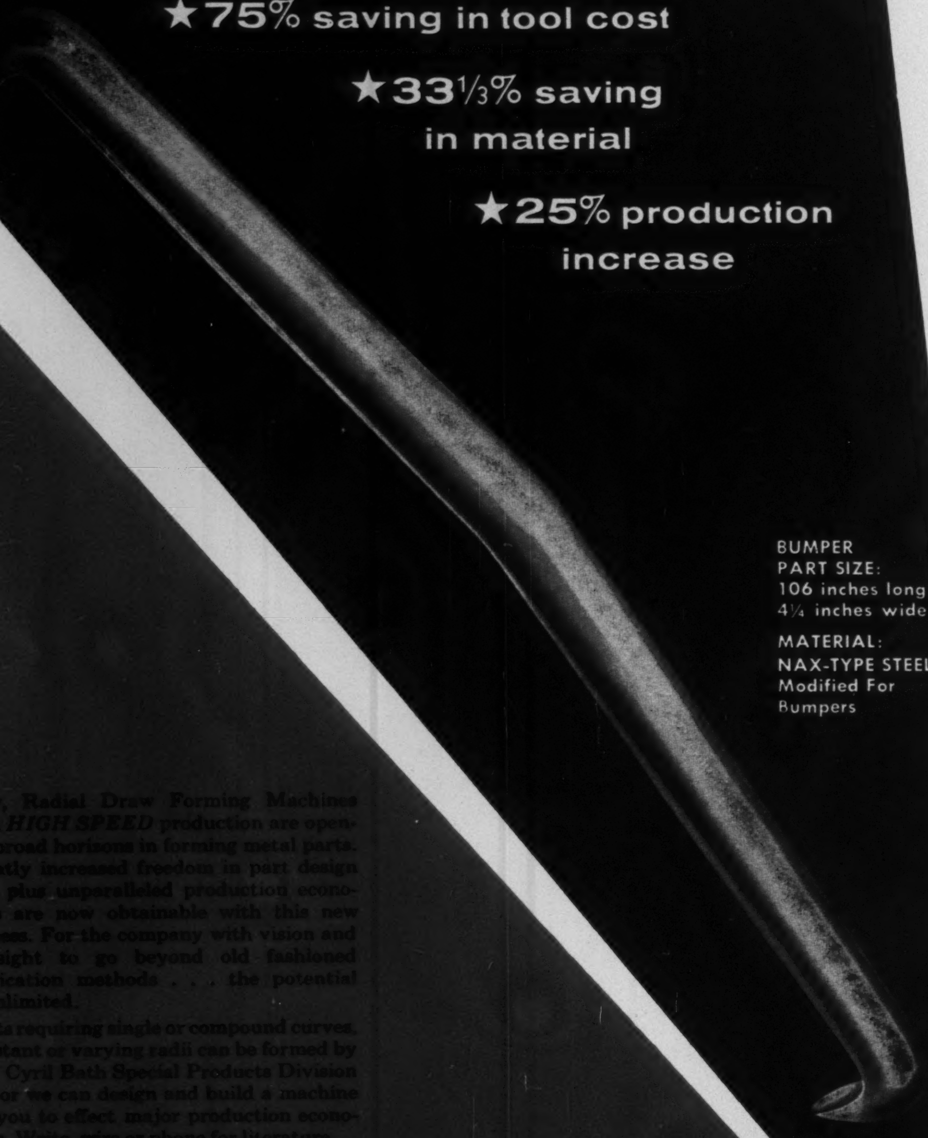
★75% saving in tool cost

★33⅓% saving in material

★25% production increase



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PART SIZE:
106 inches long
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MATERIAL:
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Bumpers

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FOR ALUMINUM: Clifford Sands, manager-rigid containers, Alcoa, with frozen citrus can.

FOR TINPLATE: R. M. Meneilly, general manager, tin mill products, U. S. Steel Corp., with his product.

Strategy Takes Form In Battle for Metal Can Market

Both tinplate and aluminum makers face a time of decision in major moves in the metal can market.

In the tough competition, both metals must have major, but expensive cost-cutting developments.

By G. J. McManus

- Big decisions are bearing down on tinplate and aluminum as they battle for position in the can market.

Producers of both metals must decide how fast to go ahead with new processes aimed at these markets. With so many questions unanswered and with cash so tight, the producers hesitate to go all out on new methods.

Time to Act—Yet pressure for action is mounting. Tin mills have watched aluminum grab off big chunks of the oil can and citrus can markets. The mills know the container field is seething with change. They are beginning to wonder if they can wait for more acceptance and development before cutting loose construction projects for the new, thin tinplate.

Aluminum has been foregoing normal profits in order to wedge into the can market. The industry has made important gains and expects more. But with profits already squeezed and prices showing new weakness, there is a question how long producers can postpone drastic measures to cut costs.

Tinplate Ready to Move—In the case of tinplate there are signs a push may already be developing. Granite City Steel Co. will install next month a Sendzimir mill designed to roll at 3500 fpm and built to make a 50 pct reduction of cold-worked sheet in one pass. In stainless production, where Sendzimir mills are widely used, normal rolling speed is around 700 fpm.

Six-stand cold mills are being installed by U. S. Steel Corp. and Youngstown Sheet & Tube Co. U. S. Steel says its new mill is designed to roll thinner gages but in the conventional manner. The Corporation says the facility is not related to the specially produced product, which it calls Ferrolite, but it is believed this mill will employ important new design concepts, in addition to having an extra stand.

Now Available—In any case it is clear U. S. Steel is in thin tinplate for keeps. In August, the Corporation announced Ferrolite was commercially available. On official price schedules, the new product was pegged well below the range of regular can stock.

Status of Ferrolite is summed up by R. M. Meneilly, general manager, tin mill products, U. S. Steel. One of the first to recognize the possibilities of the new concept, Mr. Meneilly says:

"We're making changes all the time," says Mr. Meneilly. "But I think you can say this: The basic method is here to stay. All of us see a greater potential in thin tinplate than we did at the start."

Cost Factors—The promise seen by Mr. Meneilly and others is a matter of economics. The price of a sheet of tinplate drops as thickness decreases. In their new programs, the mills are attempting to make plate with half the thickness of conventional canmaking sheet.

To date, all the thin-gage material has been produced on a development basis. For the low costs and high volumes needed for contemplated programs, the mills know they need specially designed, high speed equipment.

Things to Consider—They have been reluctant to put in such equipment without more development experience. At least four different approaches are being considered for thin tinplate. U. S. Steel in its Ferrolite program is believed to be making the final reduction after tinning.

The Sendzimir and the six-stand methods make full reduction before tinning. Another approach is said to call for a four-stand reversing mill.

User Problems — While thrashing out their own technical questions, tinplate men must also consider the attitudes and problems of users. The mills hesitate to commit themselves on new facilities before there is some assurance that volume markets exist. From experience with continuous annealing and electrolytic tinning, they know it can take years to get a new product flowing smoothly through user plants.

On the other hand, the tin mills are itching to take the offensive in the can market. They can't push thin tinplate too hard now for fear of creating demands the container people can't meet. And to get can companies to adopt the new material on a large scale, they must ultimately provide assurance of mass supply.

Aluminum Decisions—While tinplate sweats out these problems, aluminum has its own share of tough ones. Basically, the question for aluminum producers is whether to continue in the can market on market development basis or to put sales and production on a full commercial basis.

The industry began its push for can sales in an experimental way. Prices were set by negotiation; quantities were small. The first open step toward commercialization came in late 1957. At that time, Reynolds Metals Co. announced a contract to supply Esso Standard Oil Co. with aluminum oil cans at the rate of 35 million a year.

Competitive Pricing—The Reynolds cans were priced to compete directly with tinplate. This fact drew skeptical comments from other aluminum companies as well as from tinplate men. Nevertheless, Reynolds held to its policy of competitive pricing and, by 1959, the rest of the industry had gone to commodity schedules with special low prices for can stock.

How badly these schedules squeezed producers can only be guessed. Aluminum pig sells for 26¢ a pound. Aluminum sheet for oil cans is priced only 2½¢ above the raw metal.

Until recently, the margin was a little better on sheet for citrus cans. A price of 32½¢ made no one rich but it seemed to represent a step toward normal commercial selling.

Price Cuts—Now there are signs that a private price war may be applying the squeeze to sheet for juice cans. Early this year, Aluminum Co. of America dropped its price for this material in coil form. According to Alcoa, the move had no immediate significance because all aluminum cans are made from flat sheets.

What One Can Maker Says

S. M. Hopkins, president, National Can Corp., has this to say on the competition for the metal can market:

"National Can Corp. will manufacture cans from aluminum wherever it is desirable. However, at present there are only a limited number of items in the industry on which aluminum can economically be used because of its lower strength and higher cost per pound.

"Although there are some savings on shipping weight, there are other factors to consider; such as dents, and the additional cost of manufacture.

"The steel mills have now developed a thinner tinplate which will be competitive with aluminum. However, there has not been a sufficient volume of the lighter tinplate manufactured to express an opinion as to exactly where and how it will be in direct competition with aluminum cans.

"Both bear careful watching in 1961. They are both competing, for example, in the citrus field, and only time will tell which will survive. We will manufacture whichever proves best."

But in August, Kaiser Aluminum & Chemical Co. knocked 0.3¢ off its price for flat sheets. Alcoa and Reynolds recently followed in this reduction. The exact sequence of events is difficult to nail down but it is fairly evident aluminum producers are taking a licking now.

What Now? — The question, again, is how long will producers want to travel in this condition. Privately, some aluminum men will tell you present price structures are not economically sound. Aluminum has made its overall progress as a premium metal sold at premium prices, they say; schedules for canmaking sheet should recognize the advantages offered by light weight, low cost decoration, high scrap return, and merchandizing value.

But except for some extreme cases, the same men deny they are thinking in terms of broad price increases for the future. Present competitive drives work against such increases.

Costs to Cut—This means future profit relief must be in the form of cost reduction. Aluminum mills think they know how to make the necessary reductions.

"We expect with technical improvements our prices will be sound in the long run," says Clifford Sands, manager—rigid containers for Alcoa. "Some of the changes have been taken in this direction. Others will have to wait on increased volume."

Mr. Sands offers no details on the nature of these changes. Part of Alcoa's program is believed to involve the $18 million installation of cold rolling facilities announced for Davenport, Iowa and Alcoa, Tenn. More sweeping moves are hinted at.

"If we're going to compete with tinplate," says Mr. Sands, "We're going to have to compete on the same terms." He explains that this means rolling aluminum at speeds somewhere near those of tin mills. It means a whole new concept of continuous volume production for aluminum . . . from mine to shipping dock.

Steelmaker Looks At Products and Markets

J&L's Avery C. Adams takes a look at the steel industry's prospects for 1961 in this interview with Pittsburgh editor G. J. McManus.

▪ Steel mills will make at least as much steel in 1961 as in 1960. And 1960 will be the sixth best year. Demand for steel is due to improve. Price increases seem inevitable. It doesn't appear likely that an American producer will build an integrated mill abroad in the near future. This tinplate will be provided as fast as users want it.

These are conclusions stated last week, in an IRON AGE interview, by Avery C. Adams, board chairman and chief executive officer for Jones & Laughlin Steel Corp.

Regarding the state of the steel market, Mr. Adams says early November orders at J&L were up substantially from the same period in October.

Improvement Due—He is convinced that steel stocks in automotive plants are at rock bottom; overall demand is due to improve. "I think it's hit bottom and I think we're going to see an improvement." He looks for the pickup to start some time in the first quarter.

The full year 1961 will equal or top the current period, he predicts. Assuming production of more than 100 million tons, "1961 could be our fourth or fifth best year." With this kind of tonnage, he says, there is something wrong if the steel industry cannot make reasonable profits.

Higher Prices—On the matter of prices, J&L figures the present labor contract is raising its employment costs in steps of 14¢, 11¢, and 14¢. Total cost comes to $15 a ton. And nearly two-thirds of this will be in effect after December 1, 1960.

ADAMS: The price is wrong.

"It should be obvious to every thinking person that we can't increase employment costs at a rate in excess of productivity without compensating price increases and resulting inflation."

Special Problems — Mr. Adams sees no easy answer to the problem of selling much American steel on the world market.

"Our present employment costs are so much higher we can't expect to sell abroad except when demand exceeds supply," he says.

Moreover, he points out that steel mills are in a special class when it comes to building plants abroad.

Exploring Overseas — An integrated mill in Europe would have to make two million tons to be economical, he says. The cost of such a plant would run as high as $600 million.

However, he admits the possibility of such a project is getting wide consideration and that J&L is among those keeping close tabs on the foreign market.

"We just sent three men abroad to check demand," he says.

New Stockpile Study Planned

OCDM Aims at Post-War Economic Remedies

A new study of U. S. stockpile problems is about to be launched by the Office of Civil and Defense Mobilization.

Also, a vertical analysis of industry is underway. OCDM hopes to find post-war economic remedies.

By R. W. Crosby

▪ A new study "assessing stockpile needs of industrial items for post-attack purposes" is about to get underway. This study, with $50,000 for the start of research, is aimed at pinpointing the needs of the program in three areas:

1. It will point to particular places where existing inventories should be stockpiled to protect them. This probably would entail decreasing the size and increasing the number of inventory stockpiles.
2. It will identify specific industries where large inventories are needed for post-attack mobilization. This is correlated to inventory action like that taken by the steel industry before the 1959 steel strike.
3. It will name vital, indispensable items—equipment, components, and materials — which must be stockpiled.

Economic Remedies—These three areas are looked on at the Office of Civil and Defense Mobilization (OCDM) as "remedies" for the economic destruction of war.

Supplementing this study is another OCDM survey which is already underway. This survey is a vertical analysis of industry. It started recently with original research outlay of $100,000.

The vertical analysis is trying to determine industrial bottleneck items which could hold up post-war production. It is aimed at discovering what items are most needed to put a plant back into operation after war damage.

A Big Role — OCDM officials say metalworking items, particularly steel and steel products, will play a big role in the new program. Stockpiling in the metalworking industry would take on a new look, they note.

One facet of the program is to point out ways to get finished steel if steelmaking facilities are knocked out. And an answer may be the stockpiling of finished steel. If research does point to this, OCDM officials note it would not go beyond basic steel shapes.

Another facet will undoubtedly be the stockpiling of long lead-time equipment which couldn't normally be replaced fast enough to rehabilitate the economy.

Separate Studies—New concepts in machine tool stockpiling are also expected to emerge. But the machine tool stockpile is so important, vast, and complex that separate studies are underway.

The entire new mobilization program, when instituted, could be a huge boon to industry. But there are reservations.

Though this could mean millions of production dollars, much opposition is expected from industry men. However, it has been hinted that some type of tax incentive may be offered.

Then, too, many industries feel huge Federal stockpiles are a price threat. OCDM officials argue that this fear is unfounded.

Latest Stockpile Philosophy

The changing face of the nation's defense mobilization concept will lead industry into a new era of planning for survival.

The accent is shifting to reconstruction of the economy.

For years, the U. S. has been planning industrial mobilization for limited wars, general wars, and, lately, nuclear wars. Now, industrial survival to face the aftermath of war is taking its place beside them.

New ideas of stockpiling and industrial inventories are an integral part of this concept. Future strategic stockpiles could see end products replacing ores. It could see vital equipment and components heaped in innumerable piles throughout the country.

The general idea of mobilization for post-attack survival is not new. In the national plan for mobilization, it appears as an "action step" to assess the need for stockpiling construction and production equipment, industrial items, and fabricated materials for post-attack purposes, including the availability for this purpose of equipment and materials in private inventories.

But it has never gone past the idea stage. It has never been implemented. For the last year or so, the OCDM has been laying the groundwork. It may now become a reality.

Another Move For Bomb Shelters

A Federal program for construction of bomb shelters for the U. S. is becoming more and more a possibility.

The idea has never gotten anywhere in the past. Staggering cost and doubt that shelters are the answer to nuclear attack have stopped the idea before it got started.

Yet, civil defense sources are saying that the idea of government-built shelters is being approached even though it has always been the last resort. They say that more key people are being convinced that shelters are necessary to national security since the private shelter building program has fallen flat on its face, the last resort may have to be taken.

Can Defense Dept. Be Mobilized?

The office of Secretary of Defense will be greatly strengthened in the Administration of President-elect Kennedy. This is part of his plan to unify the armed services.

Making the Defense Secretary stronger will mean cutting away many of the assistants and assistants to assistants who plague the Pentagon. Both civilian and military jobs will be eliminated.

The President-elect's plans could mean an integration of the armed forces at the top level under the direction of a single military chief. The reorganization, however, would stop short total unification of the armed forces into a single uniform service.

International Move

Allegheny Ludlum Steel Corp. has formed an international company, with headquarters in Geneva, Switzerland, to carry on the company's activities in Europe and throughout the world.

Only last month, the company disclosed plans to form a major new stainless and specialty steel company in Western Europe, joining two Belgian companies in the move.

MAN-MADE CAVERN: Sun Oil Co. cavern, 380 ft down at Marcus Hook, Pa., will store propane at cost of about $7 a barrel.

Man-Made Cave To Store Propane

- Deep down—380 ft below the surface at Marcus Hook, Pa.—Sun Oil Co. will soon begin storing liquefied petroleum gas in a large man-made cavern.

Even with the expense of hacking the cave out of tough granite, storage costs will be drastically below those of surface storage in tanks.

Less Money, Space — Sun Oil estimates the underground storage will cost about $7 a barrel, compared with $40 to $50 for surface storage of propane (liquefied petroleum gas). The cavern, which has a storage capacity of 16.8 million gallons of LPG, takes up less than one-quarter acre on the surface for pumps and other equipment.

Surface storage of the same capacity of LPG would require 500 to 600 pressure tanks. About 17,000 tons of steel would be needed for equal above-ground storage, according to the contractor, Fenix & Scisson, Inc. In addition, surface storage would take up 25 to 30 acres of ground.

Other Advantages—These other advantages are pointed out by Sun Oil:

Initial costs of constructing underground storage are substantially lower. They are about 15 pct the cost of above ground storage for propane, about 40 pct those for butane.

Maintenance costs are also lower. No refrigeration is needed, it's supplied by nature.

Underground storage is safer. The stored fuel wouldn't even be disturbed by an H-bomb attack.

Other companies using mined storage are Esso Standard Oil Co., Sinclair Oil & Gas Co., Warren Petroleum Corp., Shell Oil Co., Columbia Hydrocarbon Corp., Texas Eastern Transmission Corp., and Continental Oil Co.

TV, Radio Makers Are Reversing Inroads of Foreign Competition

U. S. consumer electronic makers are beginning to wage a hard battle against foreign competition.

Japan has made huge inroads into markets here. But U. S. companies say they are now in good shape to counter with low prices.

By K. W. Bennett

▪ Is the electronic industry winning a round in the battle against imports?

From this hard-hit industry, a scattering of hints emerge that hope is at least growing.

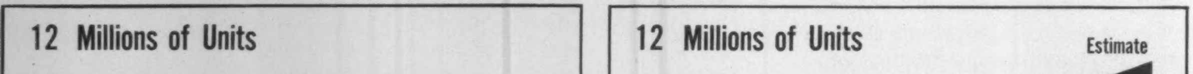
Robert W. Galvin, president, Motorola, Inc., told The IRON AGE, "Yes, I think we're getting the bead on foreign competition. It's certainly happening in consumer radio. More U. S. brand-name companies are getting down to $29.95 six-transistor radios. For example, we had a receiver we were assembling in Japan. We can now produce that transistor radio more cheaply in Quincy, Ill., than in Japan. We still use some Japanese parts. But duty, insurance, and transport boosted the cost of the Japanese receivers 20 pct. With the high worker productivity we now get at our Quincy plant, we can compete."

Oriental Flood — Japanese imports slugged the U. S. domestic market with 4 million transistor radios last year. This year, because of Japan's own export quotas, shipments to the U. S. aren't expected to exceed last year's 4 million sets.

Meantime, U. S. transistor radio makers are 14 pct ahead of last year's sales, at last counting. A marketing man told The IRON AGE he's counting on sales of 3.6 to 3.7 million U. S.-made transistor radios here, as against 3.1 transistor portables marketed by U. S. radio makers last year.

Price War—The Japanese export quota is not the only reason for the gain in domestic portable radio manufacture. Zenith Radio Corp., in June, announced a U. S.-built $29.95 transistor radio. Japanese wholesale prices, F.O.B. New York, were promptly cut to $11-$14 per radio, for a probable retail price of $20. U. S. marketing men argue that this hints the Japanese are high

People Still Look—and Listen



on capacity, are fighting for what remains of the U. S. market under the export quota. In short, there's a price war on there.

Open Road—In tube radio, or "plug-in" radios, the U. S. has had clear sailing, and much less foreign competition. Tube radios have gained steadily since the 6.3 million set low of 1954. This year, with the big selling season scheduled for November-December, the industry is 10 pct ahead of last year. A weakening in October sales has steadied. The industry is counting on another 10 pct sales gain in 1961, when output should hit 11.5 million sets.

If television set sales are in trouble, it doesn't appear to be because of foreign competition. U. S. TV set sales will probably hit only 5.5 million sets this year, against 6.3 million sets last year. Next year, they should hit 6 million sets.

Japan, Again—The biggest foreign competitor for the U. S. market is Japan. But there are indications that Japanese competition is beginning to suffer some setbacks. Recent reports suggest that Japanese radio tubes are being offered in the U. S. market at prices under the domestic Japanese price. When this happened in the Japanese steel industry, in 1958, Japanese steel was priced out of its own home market, needed import protection of its own (I. A. 3/17/60, p. 64).

A market report by the U. S. Embassy at Tokyo indicates that Japanese marketers see their own electronic industries growing 200 pct during the next four years. But television and radio sales are expected to fall.

The Comeback—It's still rough going, but U. S. consumer electronics are beginning to dig in their feet and shove in the other direction. Of the Japanese transistor radio invasion, now in its third year, one manufacturer comments, "We just weren't used to fighting. We were unprepared. Now we're coming back. It's only a start, but we're fighting back."

FINAL TEST: Transistor radios with printed circuits are given a final check for quality at RCA before packing for shipment to dealers.

Fresh Attack—To hit the export market from low cost foreign bases, Stromberg-Carlson, Zenith, General Electric, Westinghouse, Admiral, Motorola, Sylvania, Hoffman Electronics, Emerson, Philco, Du Mont, and others are manufacturing export sales goods in the market in which they will be sold.

This movement appears to be hitting unprecedented heights this year. Zenith is doing a complete switch on many members of the industry. It is actually assembling U. S.-built components in foreign plants for sale in foreign markets. Admiral is setting up a new plant in Italy, will add five foreign licensees this year for a total of 10.

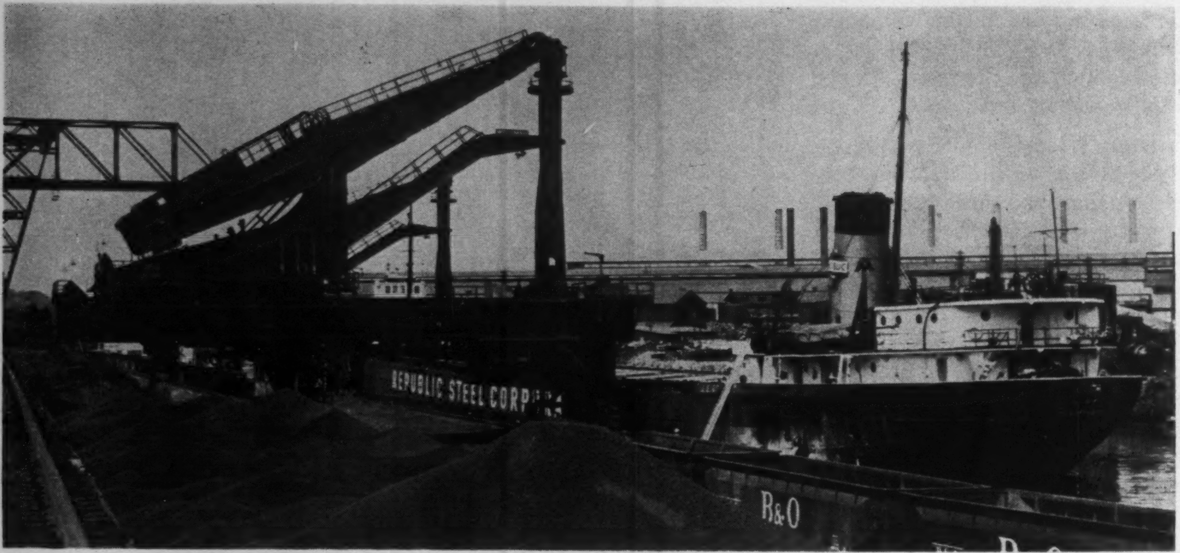
Not Over, Yet—The consumer electronics industry is making it tough for the opposition. But it's a holding action at the moment, and may need help. One researcher points out that total imports of electronic components and devices are up 75 pct in the first six months of 1960. Second quarter shipments alone were $1 million higher than the total of 1958 shipments.

To this can be added that imports of radio parts have gone from $3.3 million in 1955 to $73 million in 1960. A Japanese radio speaker is available at 48 cents against $1.06 for a comparable U. S. component.

A market research man summed it up. "We're still in trouble. They claim the Japanese are aiming now at our television business, but I'm not worried about that as much as I am high-fi and tape recorders. We're still in trouble. But this year, we're not falling over backwards."

Replacement Market—If the TV industry is still in trouble, it is the kind other industries could use in larger quantities. It is generally conceded that 1960 television sales will be off 1959 levels.

But there are exceptions: At least one marketer believes sales at the retail level through September of this year total 4.1 million sets against 3.8 million last year.



UP AND DOWN: Iron ore stocks have gone up as steel production has gone down since last spring.

Ore Season Limps to Finish

Off to a fast start last spring, Lake shipments of iron ore soon slowed down.

But stockpiles are high in relation to the present rate of steel production.

By T. M. Rohan

■ 1960 will probably go down in Great Lakes ore shipping history as the year of the false start.

Although it will probably total a respectable 70 million tons, the reversal was the most baffling in years. A flood of imports didn't help. And planners for next year are now deep in their research huddles to plan a smoother 1961.

In the wake of the steel strike last year and predictions of a 135 million-ton year for steel, just about everything that would float was out as soon as the ice broke up.

Scuttle the Fleet—By May, 94 pct of the capacity was at work. Yet in June, embarrassed steel officials were sending out the word to lay up the older boats. There would be plenty of ore to meet falling steel demand.

Some fleets which had leased boats to carry the extra load, had to lay up their own and honor the leases. At the mines, steady cutbacks made operations difficult. At lower Lakes yards, some piles are so high, the ore bridges can't clear them. And there are reports of pig iron being dumped abroad.

Not too Bad—The Lake Superior fleet, to November, had hauled 67 million tons. With probably about 3 million tons scheduled for November, it will end up at about 70 million tons (U. S. and Canada). This will be the best year since 1957.

Thanks to good December weather last year, the fleet made it 46.6 million tons despite the strike. In 1958 it was 52.8 million, and in 1957 a bulging 84.6 million.

Imported ores continued the inroads of the past few years, to the frustration of domestic suppliers. Through the third quarter they amounted to almost half of the Lake Superior total—26 million against 57 million. And by year's end would probably have a higher ratio since they continue through winter after the Lakes season has closed.

Seaway Floodgate—The St. Lawrence Seaway is one of the larger problems for Lakes ore boats.

Oliver T. Burnham, vice president of the Lake Carriers Assn. in Cleveland says Seaways statistics indicate "instead of developing a general cargo trade, 90.2 pct of the tonnage was in bulk commodities such as iron ore, coal and grain which form the lifeblood of Lake shipping.

"Separate figures for the Welland canal show that 94 pct of all freight transported through that waterway is in bulk items. The only difference is that now such business pays a toll, whereas before opening of the Seaway the Welland artery was considered a part of the Great Lakes system and as such was free to all users."

Rules of the Road—"Not a single grain cargo has been loaded on the lakes this year into an American ocean ship," he said.

"Lack of familiarity on the part of foreign vessel officers with lake sailing regulations has caused several accidents, one sinking and numerous close misses."

Foreign Ores—The biggest effect of foreign ores is price. Domestic producers haven't had an increase since 1957 when they went up 60 cents per ton. Lower price foreign competition is making them swallow more freight and labor increases. Like the steel industry this year, workers will get a pay raise in December and ore prices will undoubtedly go as steel prices.

Shipments from Labrador this year will be under 10 million tons, a drop from last year's 13 million when shipments were continued through the strike. Some shipments are also going to Europe. This market, however, is showing some weakness due to decline of markets for foreign cars. Other projects are also coming in for their share including Peru, Liberia and Venezuela.

Pellets Pile Up—Beneficiated ore and increased blast furnace yields continue to highlight the U. S. picture. Reserve Mining Co. at Silver Bay, Minn., and Erie Mining Co.'s nearby Taconite Harbor dock between them shipped over 10 million tons of pellets up to November.

Lower lakes stockpiles of pellets are sky high but producers are still in a sellers market because of the high blast furnace yields with them.

Total stocks of all ores on hand the beginning of October this year were 77.7 million tons compared to 63.3 million the same time last year, according to compilations of the American Iron Ore Assn., Cleveland and American Iron and Steel Institute, New York.

This is, of course, a comfortable margin in view of present levels of steelmaking. For the same period, consumption was 88 million this year against 79 million last year, most of which was consumed in the pre-strike rush for steel.

Foreign Trade Group Sets New Sights

The National Foreign Trade Council makes recommendations to government and industry to compete in world markets.

"More exports" is key to thinking of foreign trade experts in annual meeting.

▪ The National Foreign Trade Council closed its biggest meeting ever, in New York last week, with a long and impressive list of recommendations. These were aimed at both government and industry, both in the U. S. and outside. The list was formally called the Final Declaration of the 47th National Foreign Trade Convention.

Underlying the entire list, and most of the speeches and discussions during the 3-day conclave as well, were these basic ideas:

Aid to under-developed countries and areas should, 'whenever possible,' be made through private investment.

More U. S. industries must export more U. S. products.

It will take more effort by U. S. private enterprise to stem the rising tide of world communism.

Advice Given—No one was exempt from advice at this convention. Countries looking for U. S. investment were told: "It is essential to create conditions which will attract and safeguard investments, both domestic and foreign."

How should U. S. industry proceed overseas? Ralph J. Cordiner, chairman, General Electric Co., had perhaps the sharpest, most down-to-earth advice.

"Make a significant and continuing commitment to the cultivation of overseas markets. The timid commitment will never become a significant source of profit.

Push Strong Products—"A sound export business should lead from strength," continued Mr. Cordiner. "Cultivate export markets for those lines in which your company has already established the advantages of substantial volume and design leadership in your home market."

What about investing overseas?

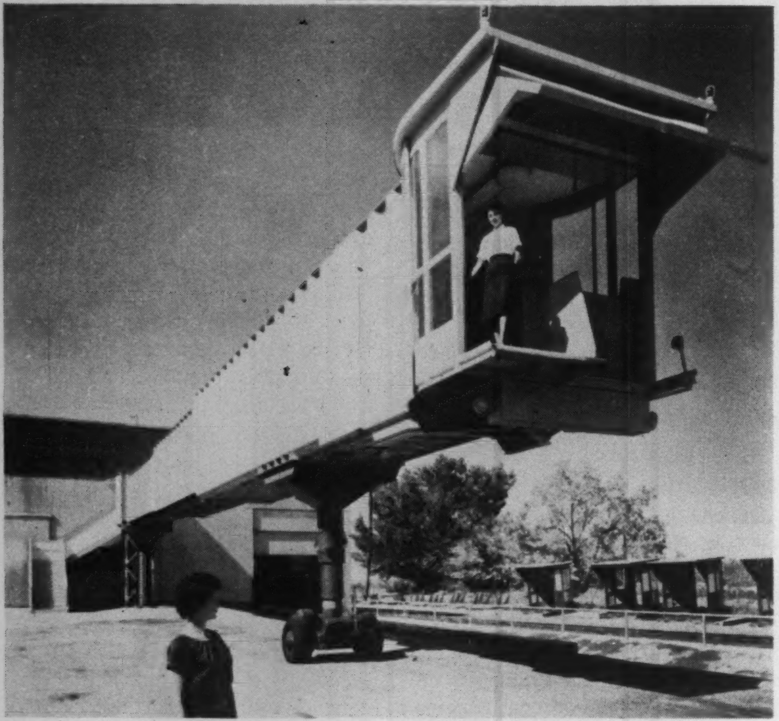
"Companies should be slow to invest where they are not wanted," advised the GE executive.

Political Storms—To the big question on how to ride out political upheavals, Mr. Cordiner said, "The key to survival through a variety of regimes is this: To make the company so visibly useful, not only to the few who may be in power, but to the fundamental needs of the people in that country, that the business rests on a basis of popular support and usefulness which all politicians feel obliged to respect."

The Council suggested that the U. S. government assist businessmen to export and invest overseas, primarily with advice and very current information and statistics. But they also recommend that U. S. policy be rephrased to cut out any "continuing preferential or reciprocal commercial arrangements" with any government which expropriates the property of U. S. citizens without proper and immediate compensation.

Balance of Payments—In the press conference at which the Final Declaration was released, Mr. Henry W. Balgooyen, an officer of the National Foreign Trade Council, and executive vice president of American & Foreign Power Co., suggested the best we could expect this year is that we would be paying out about $4 billion more than we get for our exports.

It's Like Walking Down a Hallway



FOR MODERN TRAVEL: A new passenger-protective ramp called "Jetway" is the latest thing in air travel facilities. Developed by P-I Steel Corp., a division of Stanray Corp., the telescoping steel ramp eliminates portable aircraft steps and offers all-weather protection.

Tiny Blast Furnace For Big Jobs

United States Steel Corp. has announced that work has started on the building of a small, experimental blast furnace aimed at helping to develop a better understanding of blast furnace processes.

The new facility is being installed at U. S. Steel's Universal Atlas Cement Div. plant in Universal, Pa. Plans call for the furnace to be built with many features allowing research engineers to study its interior secrets during operation.

Copper-Foil Expands In Luxembourg

Circuit Foil Corp., Bordentown, N. J., will form a company in Luxembourg and distribute copper foil in the European Common Market.

Circuit Foil is a leading producer of electro-deposited copper foil used by laminators for printed circuits.

The new company, Circuit Foil S. A., is expected to be in operation early in 1961. Production will be at the City of Wiltz in a plant completely financed by the Luxembourg government.

Giant X-Ray Gets Underway

The world's most powerful X-ray machine specifically designed for high speed radiography in the metals industry will be installed at the A. O. Smith Corp.'s Milwaukee plant next spring.

The eight million-electron-volt linear accelerator is now being built by the High Voltage Engineering Corp., Burlington, Mass.

The "Linac" will be designed to "see" through steel more than one ft thick. It will provide photographic proof of the soundness of such metal structures as core barrels for nuclear reactors and high pressure vessels for the petrochemical industry.

Estimated cost of the project is $700,000. The installation is part of the division's $4 million long-range expansion program.

Armco Plans New Pipe Mill

Armco Steel Corp. plans to build a modern combination pipe mill at the Ambridge, Pa. plant of the National Supply Co., an Armco subsidiary.

Designed primarily to produce continuous weld and electric-weld steel pipe, the new mill will also be used to stretch-reduce seamless pipe to smaller sizes.

The new facilities, scheduled for completion in 18 months, will produce continuous weld and electric-weld steel pipe at speeds up to 2000 fpm. It will be equipped for complete finishing operations, including galvanizing.

British Steel Hits New Output Record

While the U. S. steel industry is operating at about 51 pct of capacity, British steelmakers hit a new production high in October. Output there reached an average representing an annual rate of 29 million net tons.

Part of the increase can be attributed to the opening of a new steelmaking plant and expansion of existing facilities. But the biggest factor is the sustained demand for almost all steel products in Britain.

Vacuum Annealing

The Techalloy Co., Inc., has announced plans to install a unique vacuum annealing system in its Rahns, Pa. plant.

The latest move is part of an overall expansion program for Techalloy. Its original facilities with 8000 sq ft have been expanded to 80,000 sq ft since 1954.

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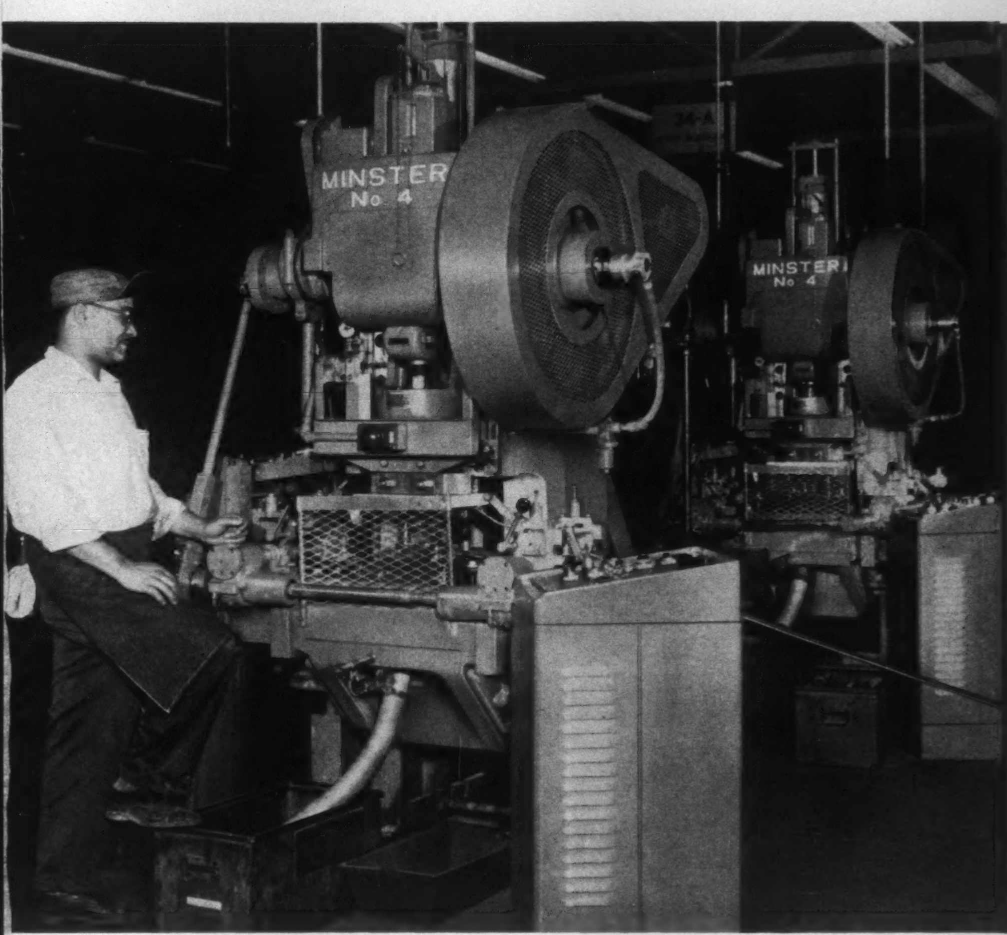

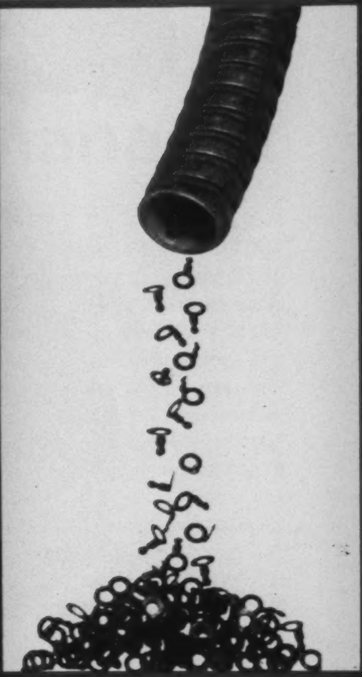

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Photos courtesy of Automatic Electric Company, North Lake, Illinois.

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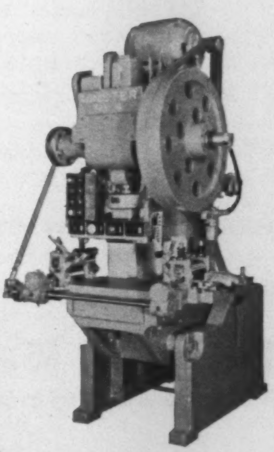

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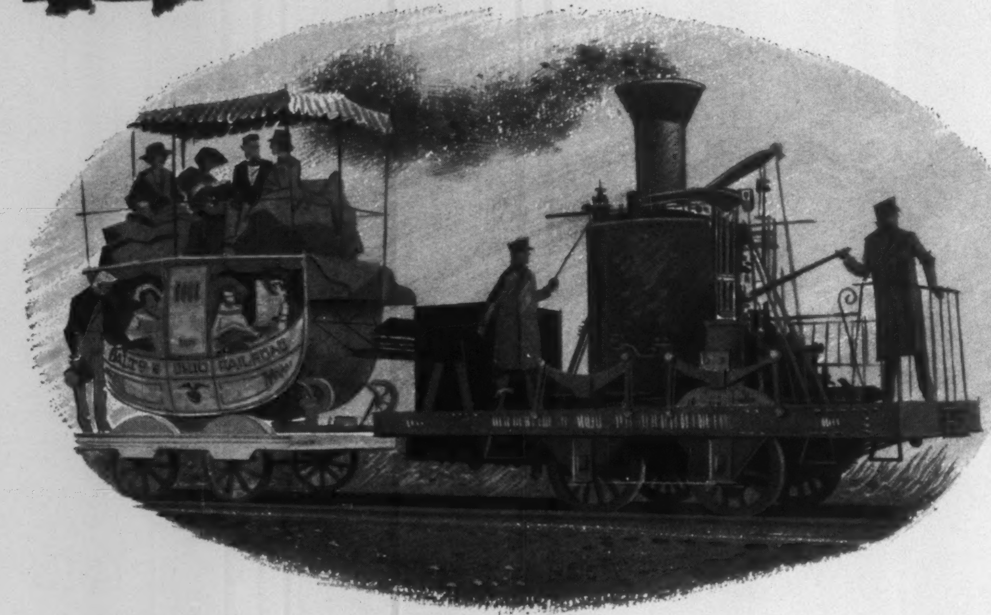

HAND IN HAND THEY GREW . . .

As the need for heavier railroad rails grew, so did the iron industry. The first railroads began with wooden rails which were iron-topped. It was not until 1844 that "heavy," entirely iron rails went into production at the Mt. Savage Rolling Mill in Allegheny County, Maryland. It was 21 years later, in 1865, when the first steel rail was rolled from a Bessemer ingot at the North Chicago Rolling Mill Co.

One of the first "iron horses" to snort flame, belch smoke and cinders, and scare livestock was the "Atlantic." Built in 1832 by Phineas Davis in York, Pennsylvania, the "Atlantic" was placed into operation by the Baltimore & Ohio Railroad. In 1835 the "Atlantic" led a procession of trains into Washington, D. C.

As have the railroads and the iron and steel industries grown, so has Baker's Magdolite, the original dead-burned dolomite. Continued research and product improvement assure that Baker's Magdolite is always 5 ways better, in composition, preparation, economy, strength and quality. The next time you buy, be sure to specify Baker's Magdolite, the original dead-burned dolomite.

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Picking an Overseas Manager

Selecting a new manager always requires careful analysis of a man's abilities.

But when choosing an overseas manager, it's even more important to define the experience and ability needed.

▪ Selecting a new manager is always difficult. But when the manager will head an overseas operation, the choice is even more critical. The overseas man will be a long way from headquarters, facing situations that never would come up at home.

With this in mind, how do you go about picking the right man for the job? Some sound suggestions are advanced by the Assn. of Consulting Management Engineers in its Acme Reporter.

Study First—If a company is just going into overseas production or marketing, Acme points out, managers are generally unfamiliar with international dealings. Some of the new problems faced: Communications over long distances, and between different environments. Getting used to different ways of doing things.

For these reasons, and others, the system of easing into an overseas operation is generally best. In tooling up for selling abroad, a company must first find out how many and what kind of managers it will need. Many companies successfully in overseas operations have put heavy stress on the use of foreign nationals. But, says Acme, "men who are familiar with and experienced in U. S. methods of doing business must provide the leadership in most places for some time to come."

What's Needed — Some of the qualities thought valuable for overseas managers may not be the most important. These include: Liking for travel, and ability to speak one or two other languages fluently. Even parakeets can talk and most people enjoy travel, it's noted. More than this is needed to be a good manager.

When dealing in other countries, these are also important: Customs and ways of doing business, the closeness of face-to-face conversations, the priorities of status and kinship, and the relative unimportance of time.

For an overseas manager, a good educational and cultural background is important. Formal business training is highly desirable. And some specialized academic work in foreign operations is good.

The Man Counts Most—But the really important qualifications are those related to the man himself. Some basics are flexibility, intellectual and emotional maturity, the ability to make close personal friends with associates, resourcefulness, and a genuine interest in new and different people and ways of doing things.

In addition, the overseas manager should have a thorough grounding in the policies and practices of the parent company. He may have trouble applying the letter of company policies, but he will have to live and work within its spirit.

Since overseas managers work with unfamiliar and fast-changing problems, they need a degree of independence and decisiveness.

When the man is finally selected he should be given clear and detailed instructions.

Where the Money Goes

▪ Three costs—wages, purchase of materials, and taxes—account for more than 85 pct of the money spent by America's largest corporations.

This is brought out in an analysis of 1958 corporate profit and loss statements of 120 of the biggest companies in the U. S. It was conducted by the Bureau of Economic Studies, Macalester College, St. Paul, Minn.

Materials and Labor—According to the analysis, the largest expense (50 pct of gross income) went for raw materials and supplies. Wage costs and benefits accounted for more than 28 pct. Taxes (Federal, state, and local) took another 7.7 pct.

The study was made on the 100 industrial corporations with the largest gross sales, plus 10 companies each in public utilities and transportation.

How Steel Compares — Among the steel companies, wage costs were the highest category, exceeded only by the office equipment makers. The percentages for steel: Wages and benefits, 39 pct; raw materials, 39 pct; and taxes, 8.83 pct.

For aluminum companies the totals were wages, 34 pct; raw materials, 41 pct; and taxes, 5.7 pct. Among automakers: wages, 28 pct, raw materials, 55 pct, taxes, 5.1 pct.

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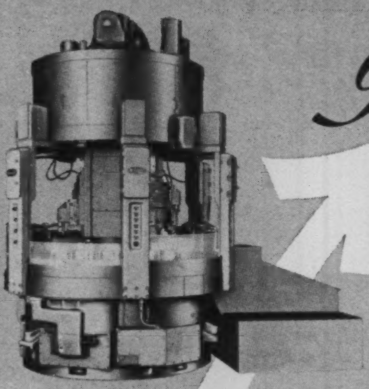

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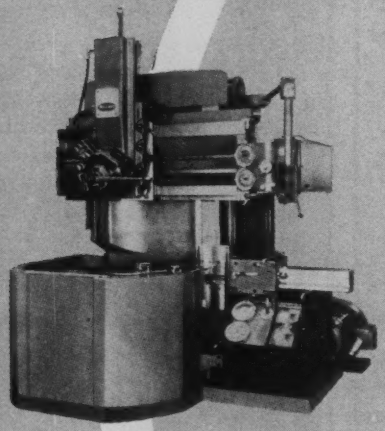

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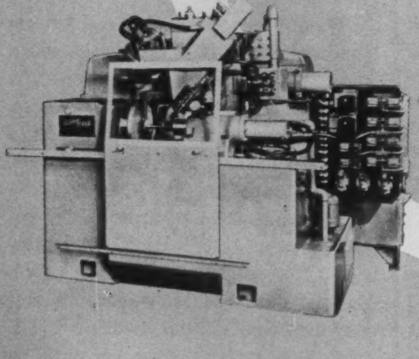

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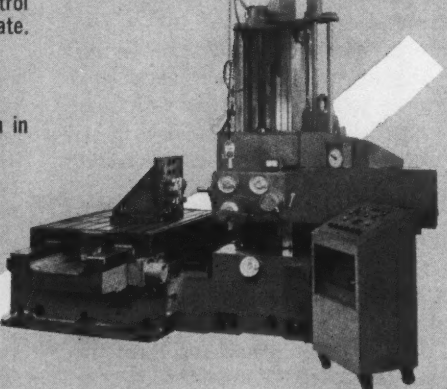


Has Corvette Reached Its Peak?

After 5 Years of Climbing, Production Will Level Off

Chevrolet reached capacity output of Corvettes last year. It expects no slackening in 1961.

Boosting output would require new facilities or changing from fiberglass. It won't do either.

By A. E. Fleming

▪ The number of Corvettes now being made would allow Chevrolet to profitably switch from a fiberglass to a steel body. But it won't. In the 1960 model year, Corvette production reached 10,000 units for the first time.

"We always thought if we ever topped the 10,000 level it wouldn't pay to keep the fiberglass body," says Zora Arkus-Duntov, director of high-performance vehicle design and development in Chevrolet's engineering dept.

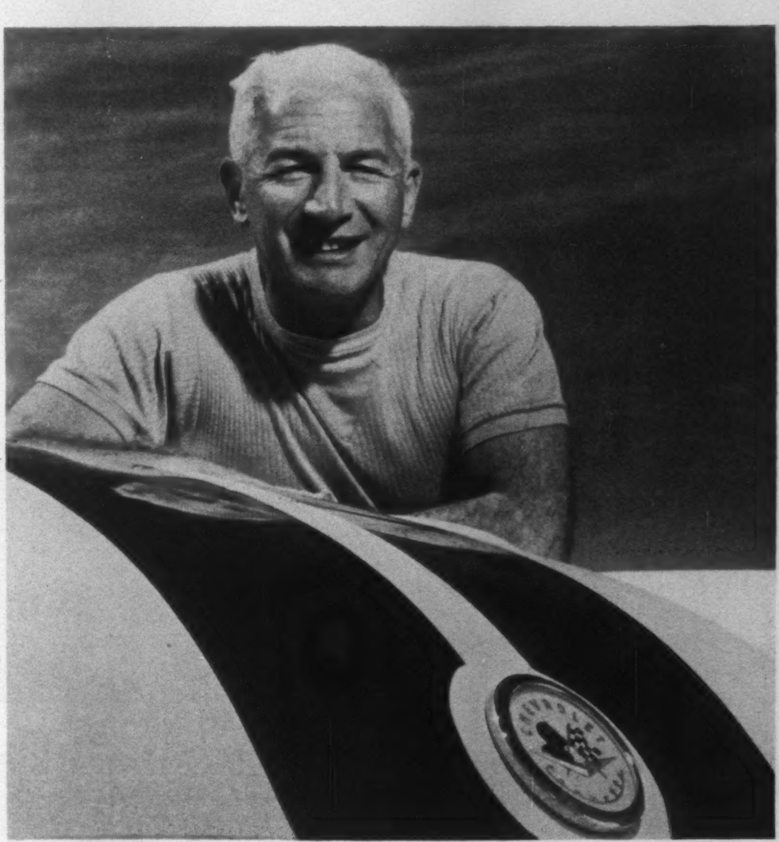
Fiberglass Stays—High volume runs in steel would be cheaper, he says, "but fiberglass is light and impervious to rust. You can't get these qualities with steel, so it's likely we'll stay with fiberglass."

This could mean Corvette has reached a leveling-off in production after five straight years of increases. If this isn't to be the case, then Chevrolet must expand Corvette assembly facilities.

As it stands, the 1960 model was turned out on a capacity basis. The single assembly plant, in St. Louis, built Corvettes on a 10-hour day, six-day-a-week schedule. More of the same is expected for 1961.

Wrong Track—But it has had rough times, too. The first Corvette was a 1953 model. Only 300 were made. Production climbed to 3640 in 1954, but tumbled to 700 in 1955.

What was the matter? "We weren't on the right track," says Mr. Arkus-Duntov. "Our first idea was to make a good-looking, fair performing car with not much comfort. We wanted eye-appeal above all else. We thought Americans wanted that, but we were apparently wrong. The car wouldn't sell."



SPEED KING: Zora Arkus-Duntov heads the high-performance vehicle design and development section of Chevrolet's engineering department.

New Philosophy — A switch in philosophy was evident when the 1956 model bowed. It was a better performing car with the necessary comfort two riders required. Sports-car enthusiasts took to it when it raced an average 150 mph over a measured mile at Daytona Beach, Fla.

The 1956 model output jumped to 3467 units. This was followed by 6339 in 1957, 9168 in 1958, up to 9670 in 1959, and 10,261 in the 1960 model year.

Weighing In — When the first Corvette came out, the body weighed 340 lb. Since then, primarily because 20 lb of steel reinforcements have been added, today's body weighs about 382 lb.

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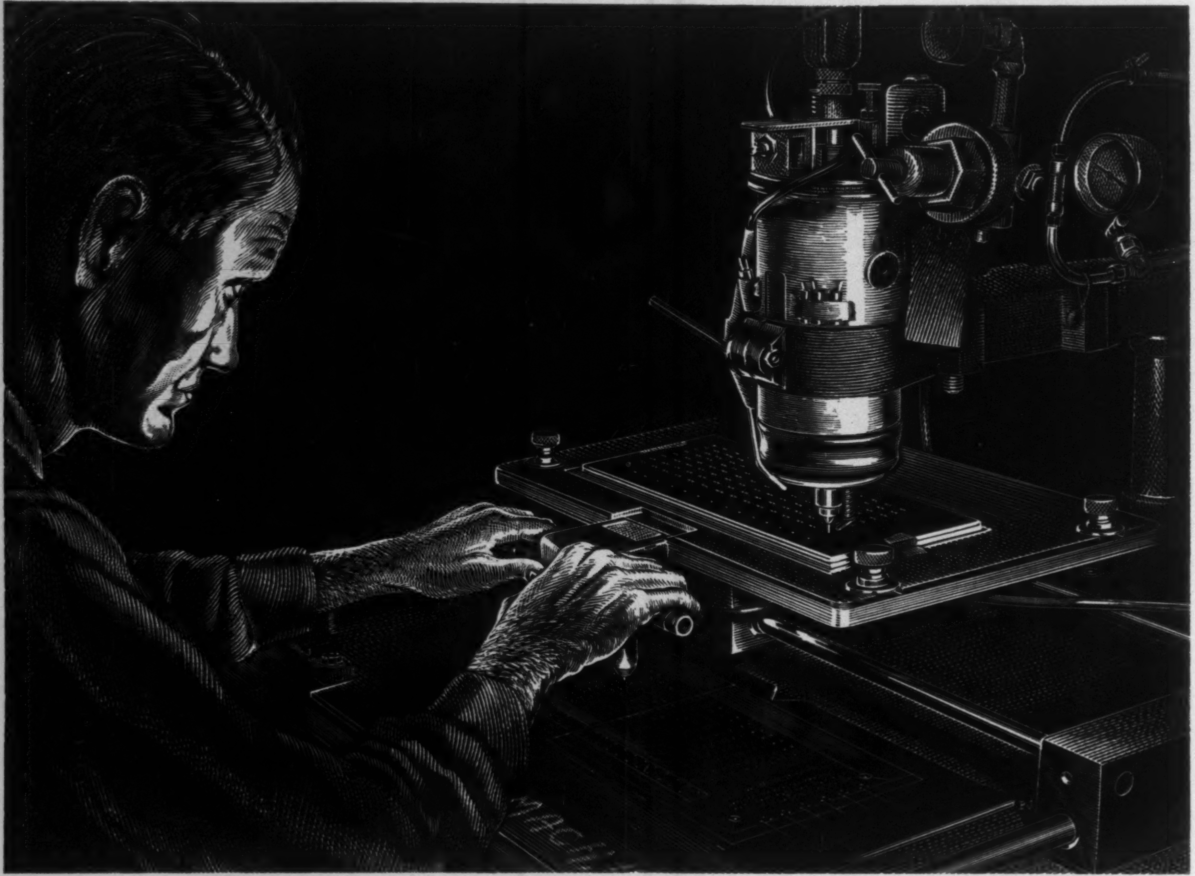

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USSR Races U. S. for Markets

Coast Engineers Say Problem Is Very Real

Leading engineers say the U. S. will have to step up its efficiency to keep Russia from gaining new markets.

Russia can turn out products faster and cheaper than U. S. manufacturers.

By R. R. Kay

▪ The U. S. must step up both its tempo and efficiency. If it doesn't, the Russians will grab our foreign markets within six years, says a panel of West Coast engineers.

Russia is making huge strides in automation and offers a terrific challenge to U. S. machine tool makers. In fact, to manufacturers in general, they say.

Big Difference—For example, a plant in the Soviet Union makes an engine lathe every 15 minutes. That's a feat unduplicated in the free world, say the experts. The Russians sell it for $3,000 in Western Europe. The same lathe brings $10,000 in this country.

The Russians make a large boring mill that sells for $21,000. A U. S. producer must get $46,000. Another important difference is the fact that the Soviets can turn the boring mill out in 30 days.

Hard Road—Many specialists on the Russian economy agree that American industry faces a tough race for manufacturing supremacy.

How to meet the challenge? The special panel took a crack at it last week in Los Angeles at the American Society of Tool and Manufacturing Engineers' 1960 Western Engineering Conference.

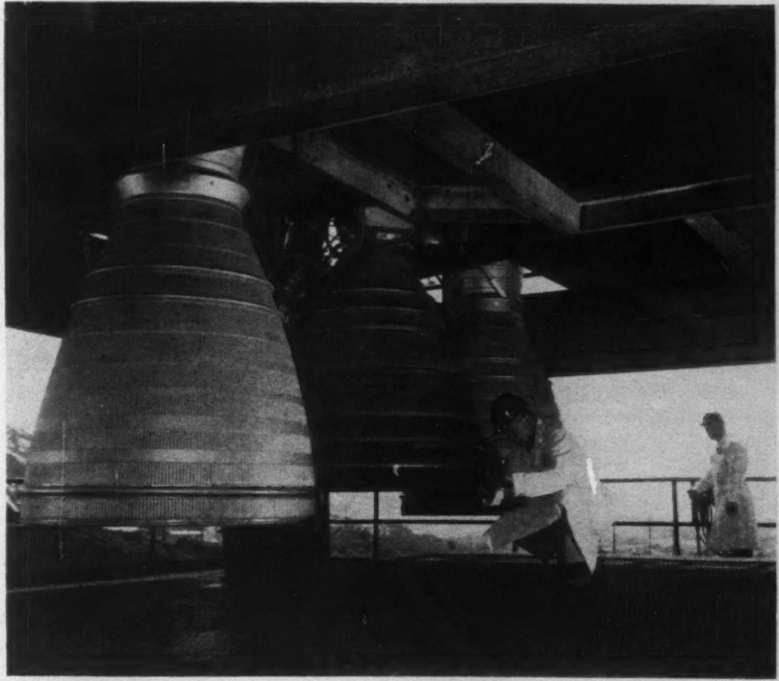
Walter Kassebohm, executive vice president, Marchant Div., Smith-Corona Marchant, Inc., moderated the panel. Mr. Kassebohm believes the Soviet threat is very real. And that only through a new approach in thinking by management and labor can it be beaten.

Henry J. Nobels, manager, applications engineering, Scientific and Process Instruments Div., Beckman Instruments, Inc., Fullerton, Calif., says, "We can learn from the Russians in the areas of the mathematics, theoretical physics, and fundamental investigations in the areas of automation."

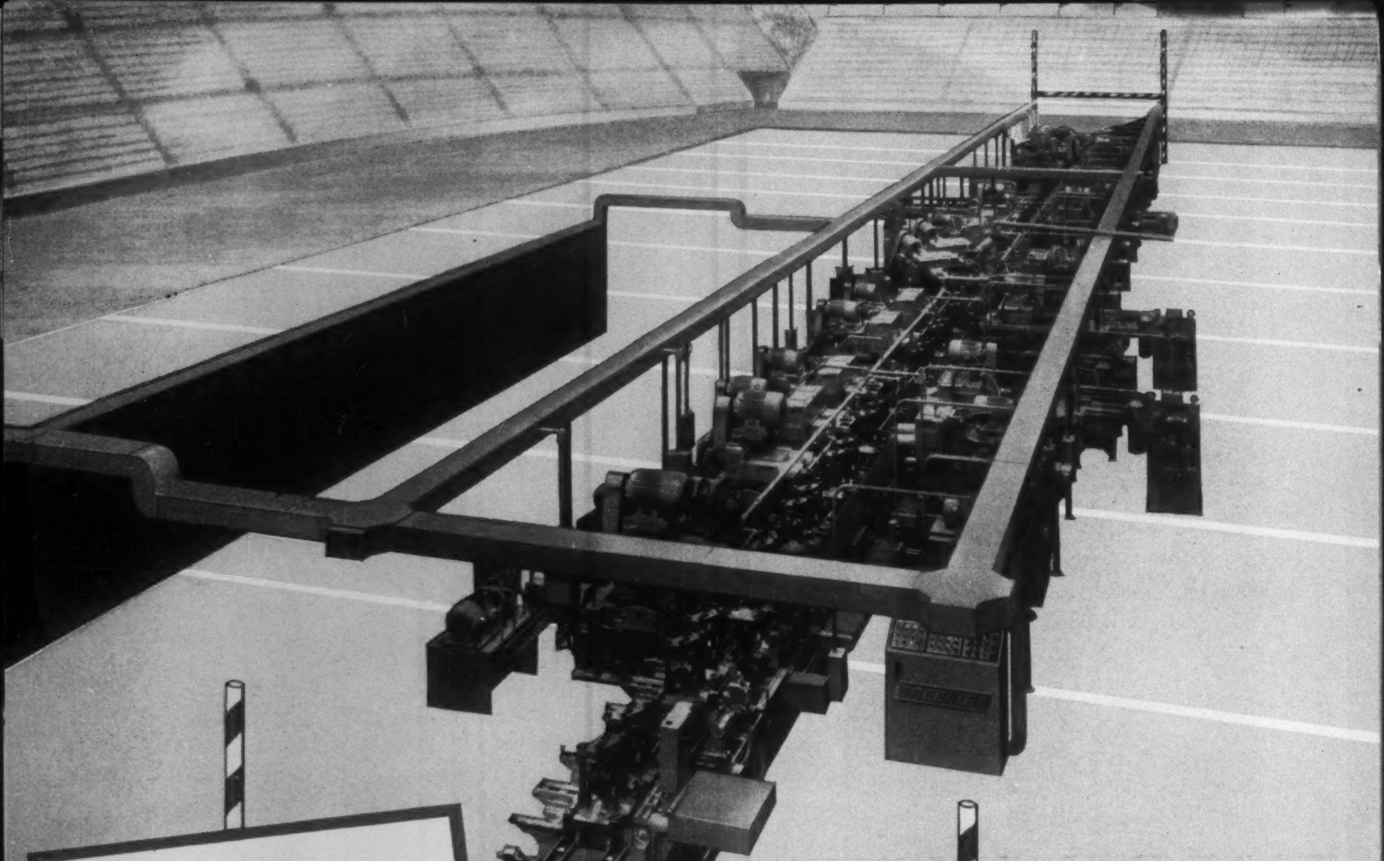
Great Strides — Nevil L. Bean, staff engineer, Ford Motor Co., says he is highly impressed with the strides made by the Russian metalworking industry. He saw there a completely automated roller bearing factory like no other he has seen in the U. S.

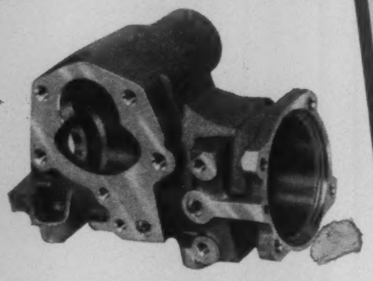
Edward E. Tuttle, executive vice president, Essick Manufacturing Co., Los Angeles, says he doesn't think Soviet industry exceeds that of the U. S. in quality or quantity. "I believe it to be markedly inferior to ours and I believe that it will remain so for a long time to come."

Readying for Space Travel



MERCURY PROPULSION: First manned orbit by a NASA spacecraft will be launched by this MA-2 liquid propellant rocket engine system developing more than 360,000 lb of thrust. It is built by Rocketdyne Div., North American Aviation, Inc., and has launched satellites.





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Ed: This looks good to me - let's discuss it - J.B.

Diecasters Take a Look Ahead

Subjects such as permanent molding and aluminum casting were debated at recent Die Casting Engineers meeting.

European speakers discussed trends overseas, noted Russians plan a diecast engine block.

By R. H. Eshelman.

■ The recent meeting of the Society of Die Casting Engineers took great interest in competitive and technical problems the industry faces in the years ahead.

More than 500 persons registered for the Technical Congress held in conjunction with the Exposition. At least 350 engineers and technical executives attended the separate sessions where some 31 papers were presented.

What Was Discussed—The untelevised debates waxed warm on such subjects as competitive processes permanent mold and aluminum sand casting, particularly for large parts such as engine blocks and heads. Thomas Pfaff, assistant foundry superintendent of Pontiac Motors, noted that there's evidence of an impending aluminum boom, especially in the auto industry. Aluminum castings by 1970 will consume some 1750 million pounds a year, he reports, or nearly a five hundred pct increase over 1960.

Two Hundred an Hour—Further, he declared that with one set of patterns, costing no more than a single set of dies, the company's sand foundry is ready to turn out 200 cylinder blocks an hour. He believes the flexibility of the sand casting process will be an important factor because of engineering changes common to the auto industry. Also maintenance of a battery of dies and diecasting machines might prove prohibitive, he suggests. Experience in closer tolerance grey iron castings has prepared the foundry for requirements of aluminum castings, and solving technical problems, he feels.

The case for diecasting was presented by Dr. A. F. Bauer, Doehler-Jarvis Div., National Lead, and a recognized world authority on the process. His plant is in production of water-cooled six-cylinder engine blocks (American Motors), and said to be the first example of an aluminum diecast engine in mass production. The permanent mold process was also described as a competitive process, with certain advantages, as well as limitations. It's being used by Chevrolet in production of the Corvair air-cooled block.

European Views—European experience in large diecasting is limited, but highly successful, suggested G. Triulzi, president of an Italian firm that builds diecasting machines.

Capping the debate were the words of Joseph G. Rayniak, vice chairman of the board and director of research of Outboard Marine Corp. Speaking at the banquet of the engineering society, he said that diecasting has built their industry. Products valued at more than $170 million—outboard motors, chain saws, power lawn mowers, etc.—depend on diecasting for success.

It's Only Second Largest at Chrysler

SECOND LARGEST: This stamping for the underbody of 1961 Dodge trucks is the largest ever pressed out at Chrysler Corp.'s Highland Park plant, but it's still smaller than stationwagon roof stampings.

INDUSTRIAL BRIEFS

Contract Awarded — National Steel Corp. awarded a general construction contract for a basic oxygen steelmaking shop to H. K. Ferguson Co., Inc., Cleveland. The shop, with an annual capacity of 2 million ingot tons, will be constructed at the plant of Great Lakes Steel Corp., Detroit subsidiary of National Steel.

Award Presentation—Joseph G. Rayniak, vice chairman of the board and director of manufacturing research for the Outboard Marine Corp., Waukegan, Ill., recently received the first achievement award of the Society of Die Casting Engineers. The award was presented at the first National Die Casting Exposition in Detroit.

Further Diversification — The Santa Cruz, Calif. plant of Sylvania Electric Products, Inc., has purchased the printed circuit facility of Curtiss Wright Corp. at Santa Barbara, Calif. The equipment is being moved to the Santa Cruz facilities and the move is another step in Sylvania's diversification program.

An Acquisition — The Grimes Engineering Corp., designers and manufacturers of machine tool accessories, announced the acquisition of LeCount Tool Works, Inc., West Hartford, Conn. LeCount mandrels are sold throughout the United States and Canada.

Adding On — Cummins Engine Co., Inc., Columbus, Ind., is planning for a $1.7 million addition to its manufacturing facilities. Construction on the building which will house all engine assembly functions is to start this month. Completion is scheduled for August, 1961.

Big "D" — Diamond Chain Co., Inc., Indianapolis based subsidiary of American Steel Foundries, opened a factory warehouse and sales office in Dallas. The 7500 sq ft warehouse will provide one day delivery into the five state area of Texas, Louisiana, Oklahoma, Mississippi and Arkansas.

Available List — Beryllium copper strip is now available from any of the nation-wide Chase Brass & Copper Co. warehouses. Applications of this metal include electronic parts, springs, terminals, fuse clips, fasteners, washers, and contacts. Its value lies in its spring temper strength while retaining high electrical conductivity.

Construction Started — Foote Mineral Co. started construction recently on a butyl lithium plant at its new Johnsonville, Tenn. property. The plant will have a design capacity of 100,000 lb. annually of n-butyl lithium. Foote officials say the new facilities can also be expanded to double that capacity should the market warrant it.

Going Up—Ajax Composite Die Co., Detroit, has begun construction of a new plant which will double its facilities for production of composite die sections. The new single story, steel and concrete building has 13,000 sq ft of floor space.

Bob Weber
The IRON AGE

"We've been through the winter slump, the spring soft-spot, and the summer drop-off. . . . I wonder what's next."

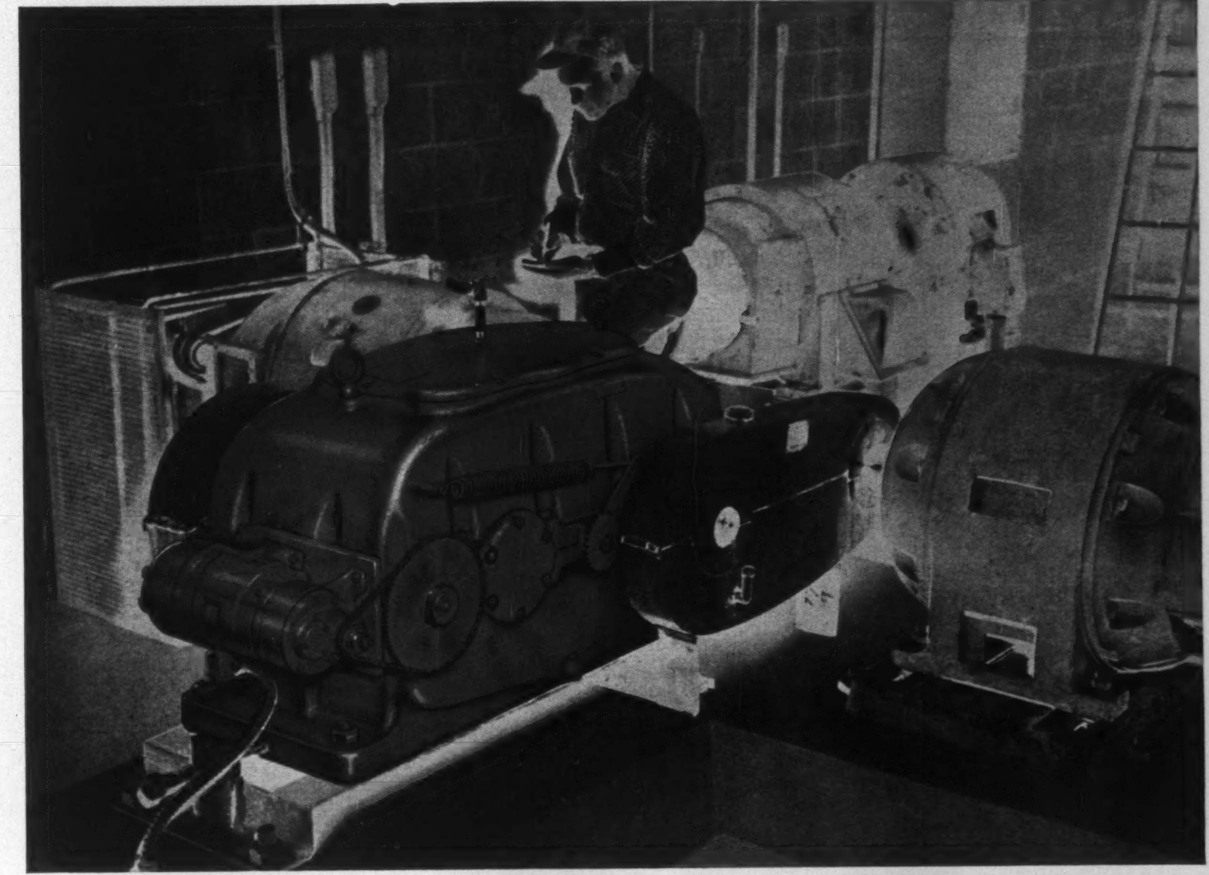
Getting Bigger—A 400 pct expansion program in production of sheet aluminum is underway at Consolidated Aluminum Corp. New facilities will increase capacity in presently produced grades of specification and commodity sheet. The major rolling mill equipment is being supplied by the Blaw-Knox Co. and major electrical equipment by General Electric Co. Facilities are scheduled for completion by the first quarter of 1962.

More Space—Continental Screw Co., New Bedford, Mass., has added a new addition to its Richmond, Ind., warehouse. Stocks of Phillips and slotted wood, machine, tapping and thread cutting screws made by Continental will be carried on about three quarters of an acre of floor space.

Getting Married — An intended merger was made jointly by S. L. Cate Jr., president, Bannock Steel Co., and G. E. Nielson, Cody, Wyo., president of Husky Oil Co., representing the Gate City Steel interests. The new operation will be directed by Bannock Steel management, with Cate acting as general manager. It will be named Bannock Steel Corp., and will have an authorized capitalization of $3 million.

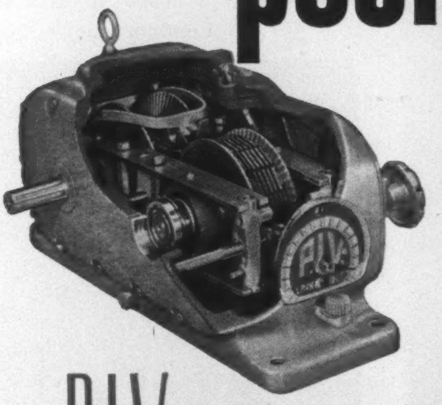
Strip Line—A strip line for producing aluminum sheets for can stock has been installed at the McCook, Ill., sheet and plate works of Reynolds Metals Co. and now is in production. The McCook line takes aluminum sheet produced at the plant, cleans it and cuts it into sheets especially for can specifications.

Air and Sea—A Navy contract totaling $29,190,000 for the construction of two guided missile destroyers has been awarded to Todd Shipyards Corp., Seattle. The Navy says the contract price obtained from Todd represents a cost reduction of approximately $1 million per ship, under contract prices obtained for any previous guided missile destroyers.



For stepless, slipless, accurate, infinitely variable speed control:

positive P.I.V. VARIABLE SPEED DRIVES



Unique in operation, unmatched in accuracy! That's Link-Belt P.I.V.—the *only* chain-driven variable speed drive. Teeth—not tension—permit instant ratio changes with no loss of efficiency, regardless of load conditions.

P.I.V.'s exclusive all-metal, self-tooth-forming chain consists of packs of free-sliding steel slats which serve as teeth. The chain meshes with radially grooved wheels cut to a constant depth toward the wheel periphery. Beveled sides of the grooves offer gripping areas . . . provide a positive, nonslip contact at any speed, under all loads.

Link-Belt P.I.V. drives are available in 8 sizes and 16 standard types, in capacities from ½ to 25 hp—horizontal or vertical housings. Type RS P.I.V. variable speed drive is available in capacities up to 50 hp.

Book 2274 contains the complete P.I.V. story. For your copy, contact your nearest Link-Belt district sales office or authorized stock-carrying distributor. Refer to the yellow pages of your phone directory under Power Transmission Equipment.

P.I.V. LINK-BELT
VARIABLE SPEED DRIVES

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,348

MEN IN METALWORKING

H. C. Jones, elected president and a director, The Electrado Corp., Los Angeles, Calif.

Ford Motor Co. — **R. S. McNamara,** elected president, succeeding **Henry Ford II,** who becomes chairman of the board and chief executive officer; **J. O. Wright,** appointed vice president and group executive, Car and Truck Divisions; **I. A. Iacocca,** elected a vice president of the company and appointed general manager, Ford Div.; **C. R. Beacham,** appointed vice president, marketing.

The Budd Co., Railway Div.—**J. F. Clary,** appointed vice president, sales.

Fairbanks, Morse & Co.—**Arthur Sternberg,** appointed asst. vice president, operations.

Keuffel & Esser Co.—**E. E. Parrish,** appointed director, international marketing; **T. L. Mancuso,** appointed product manager, surveying products.

Lukens Steel Co.—**J. H. Proctor,** appointed manager Market Development Div.; **J. D. Heffernan,** promoted to manager, Application Engineering Dept.

Island Creek Coal Sales Co.—**E. J. Hodder, Jr.,** named asst. to consulting engineer.

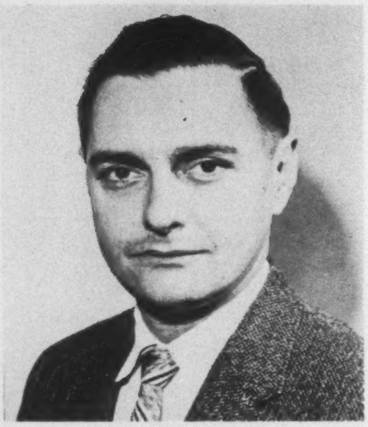
Jessop Steel Co.—**J. H. Mumper,** named chief engineer for the company and subsidiaries.

Cleveland Div., Midland-Ross Corp.—**N. H. Hutchison,** appointed director, purchases.

Electronics & Instrumentation Div., Baldwin - Lima - Hamilton Corp.—**R. M. Donovan,** appointed factory manager.

Birdsell Div., Susquehanna Sciences, Inc.—**R. G. Beckstrand,** appointed sales manager.

Hoover Ball & Bearing Co.—**W. D. Reynolds,** promotel to Eastern zone manager.



C. W. Aagaard, appointed vice president, sales, The Jacobson Nut Mfg. Corp., Kenilworth, N. J.

Warner Electric Brake & Clutch Co.—**John Dewey,** appointed manager, customer service.

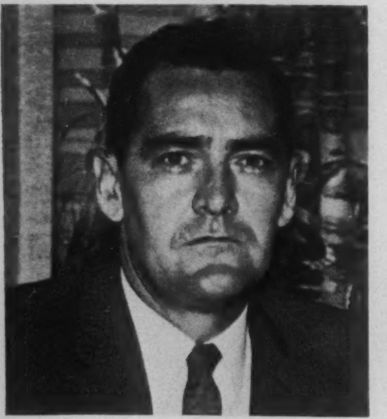
Skinner Precision Industries, Inc. Skinner-Horton Chuck Div.—**P. E. Dillberg,** appointed sales manager.

Electro - Tec Corp. — **George Greer,** named manager, Virginia Div.

Stromberg-Carlson's Electronics Div.—**J. P. Vang,** appointed asst. manager, field sales.

Crouse-Hinds Co. — **Edward Fiesinger,** named labor relations manager; **John Feola,** becomes general foreman, Iron Foundry; **Anthony Izzo,** promoted to general

(Continued on P. 76)



J. T. Le Beau, elected vice president, Abrasives Div., Besly-Welles Corp.

W. O. Dick, appointed vice president and general manager, Canton Malleable Iron Co., Canton, O.

F. L. Blodgett, appointed general manager, Hard Surfacing Products Div., Alloy Rods Co.

in 1960...

LOOK TO

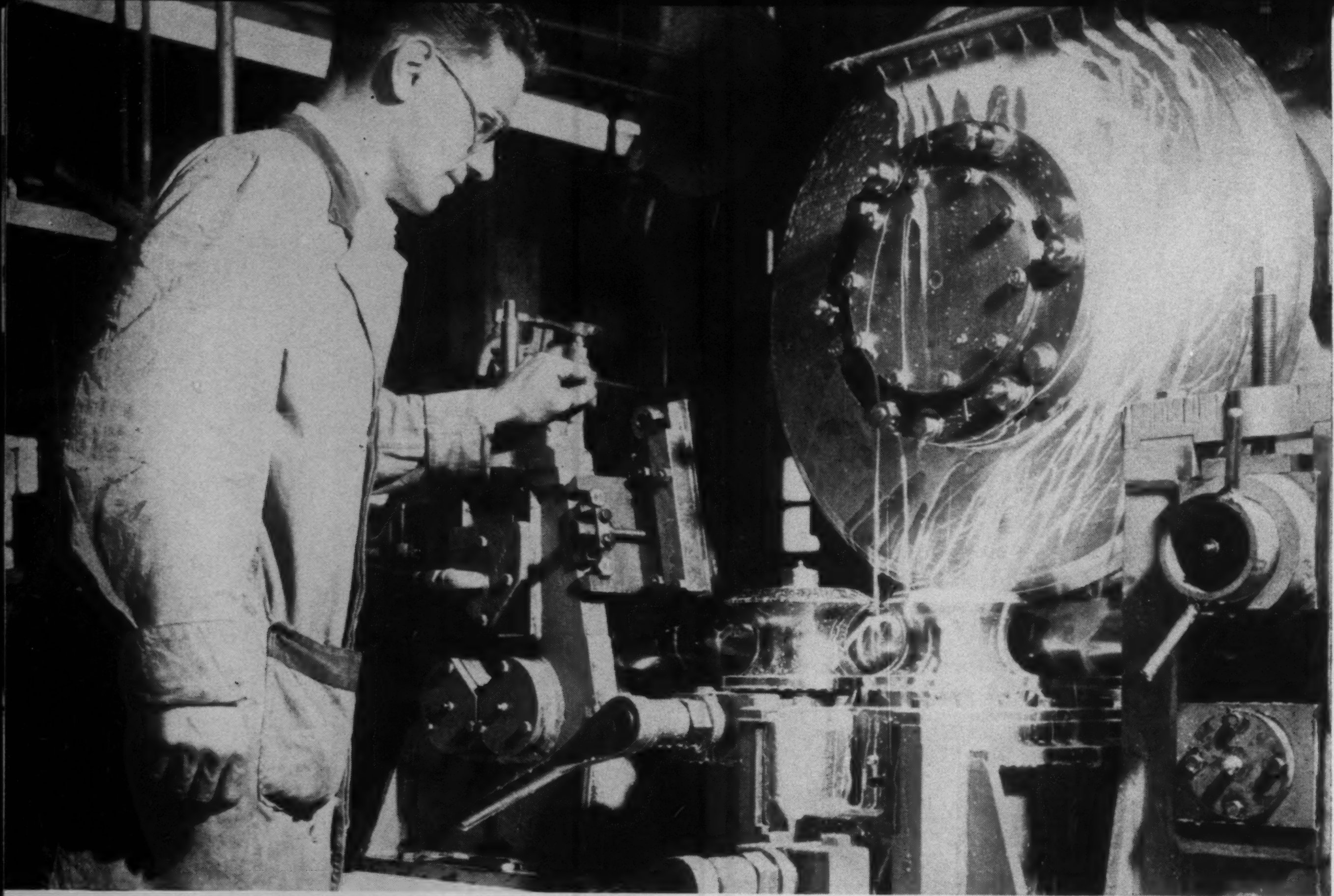
McKAY

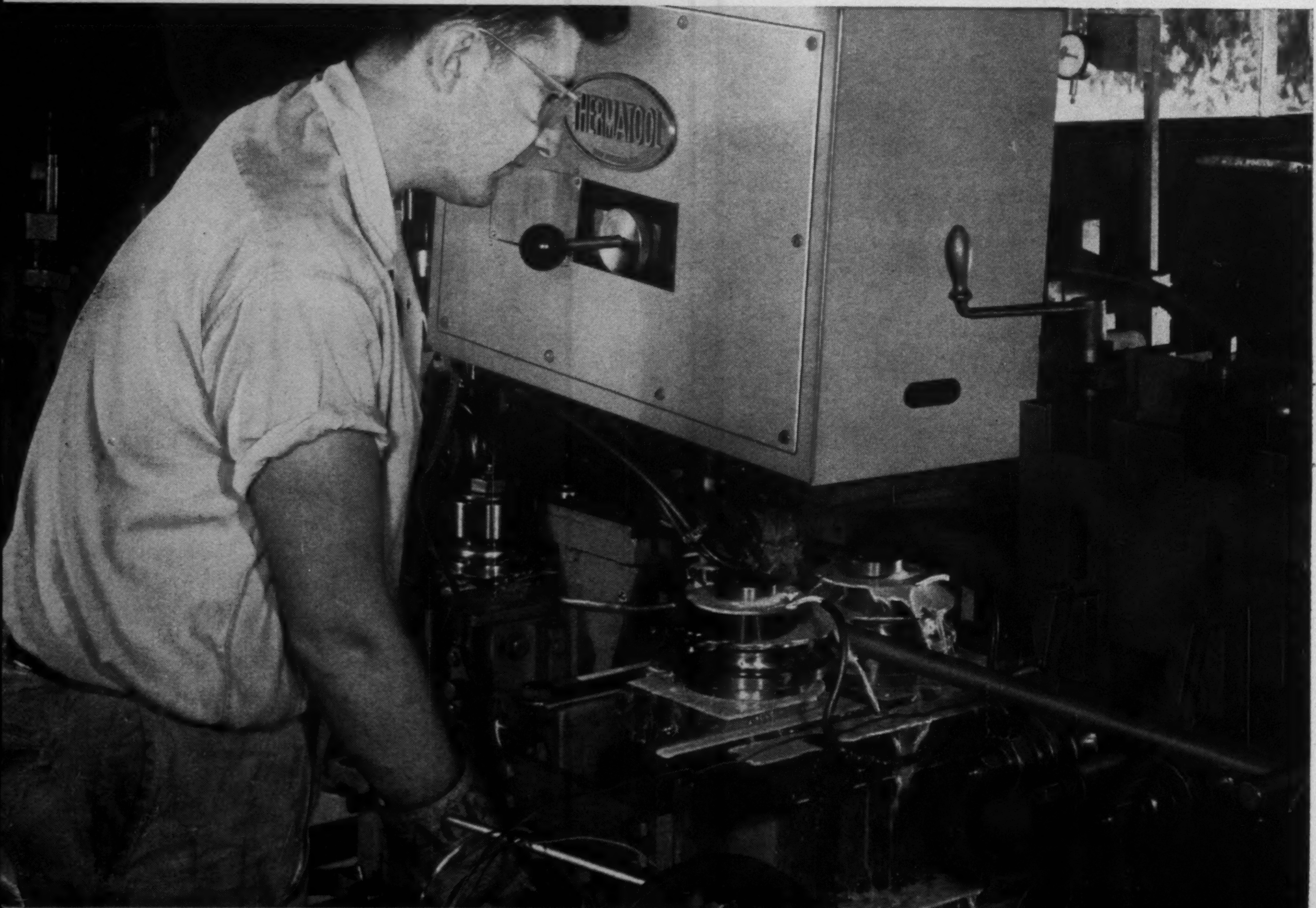
McK

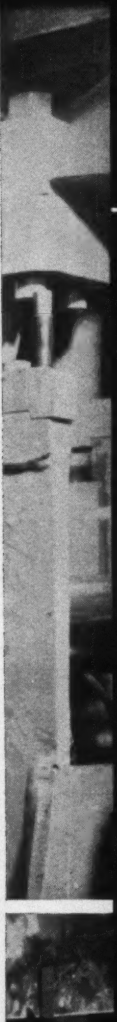
MACHINE

**FOR PROGRESS
IN METAL
PROCESSING**

FOR EXAMPLE . . . Why does McKay Machine adhere to its long-time policy of custom design of metalworking equipment? "It gives us more for our money," say customers. A case in point appears on the following pages.




THERMATOOL



A CASE IN POINT

Why users prefer McKay Custom Engineered Tube and Pipe Mills

Each McKay tube or pipe mill is designed to provide you with maximum production output at minimum production cost, high quality product, and trouble-free operation. Care is taken to design each component in a tube mill to attain these ends, using the best designs McKay engineers have to offer and the cream of the available ideas of others.

For example, in addition to our own McKay* welding system, McKay offers the amazing new Thermatool® tube welding process for welding both ferrous and non-ferrous tubing and pipe of any diameter. We feel that you deserve the best, since you've learned to expect the best from McKay Machine.

If it's custom engineered by McKay Machine, you can be sure it's designed to exactly fit your specifications, present and future. Before you invest in another tube mill, let us put you in touch with the McKay user nearest you. For if you take the time to compare, you'll find you profit most with a customer engineered tube mill by *The McKay Machine Company, Youngstown 1, Ohio.* *T.M.

®"Thermatool" is a registered trademark of the New Rochelle Thermatool Corporation, New Rochelle, New York, and is used with their permission.

TOP PHOTO: A 150 KVA McKay Electric Resistance Welding Unit, part of a McKay series 500 Tube Mill at the Canadian Acme Screw & Gear Co., Ltd., Toronto, Canada.

BOTTOM PHOTO: A 450 Kc Thermatool* Welding Unit, installed in a McKay series 400 Tube Mill in the Delair, New Jersey, plant of The Wheatland Tube Co.

LOOK TO

McKAY McK MACHINE

FOR PROGRESS IN METAL PROCESSING

COST-CUTTING PRODUCTION TEAM!

. . . the two-way answer to assembly problems!

Here's a combination that cuts production costs and gets rid of assembly problems in a hurry—Milford Tubular Rivets made to high quality standards to assure a better finished product for you . . . Milford automatic rivet-setting machines that can be quickly adapted to your particular fastening needs. Write for more information on how you can put this team to work.

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNA.
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.

(Continued from P. 72)

foreman, Nonferrous Foundry; **G. J. Landers,** named product development manager.

Goodyear Aircraft Corp.—**C. J. Peirce,** named chief engineer.

A. W. Keusch, elected asst. secretary and appointed general counsel, Lukens Steel Co., Coatesville, Pa.

The Regent Steel Co., Stainless Steel Div.—**J. V. Scott,** appointed sales manager.

Raytheon Co.—**A. P. Young,** named director, international sales and services.

Jones & Laughlin Steel Corp.—**S. W. Stouffer,** appointed director, construction and maintenance.

L. L. Hartmann, appointed general manager, Cooper Alloy International.

M. P. Orr, appointed general sales manager, Mackintosh-Hemphill Div., E. W. Bliss Co.

American Steel & Wire Div., U. S. Steel Corp.—**C. E. Cronauer, Jr.,** appointed asst. general traffic manager.

Technic, Inc.—**Dr. E. A. Parker,** promoter to technical director and **J. A. Powers** to research director.

Republic Steel Corp., Berger Div. — **Ron Bowers,** named sales representative, Div. sales offices in Baltimore, Md.

Dr. Charles Register, named general manager, research laboratories, Paoli, Pa., Burroughs Corp.

American Motors Corp.—**F. L. Schaller,** appointed European regional sales director, Automotive Export Dept.

Industrial Products Div., the Atlantic Refining Co.—**H. B. Elliott,**

(Continued on P. 78)

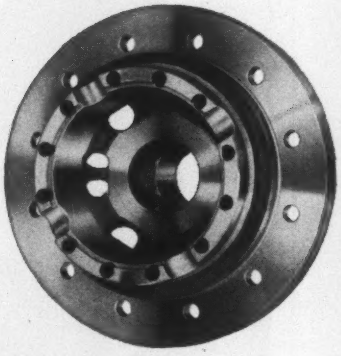
if your twin problems are

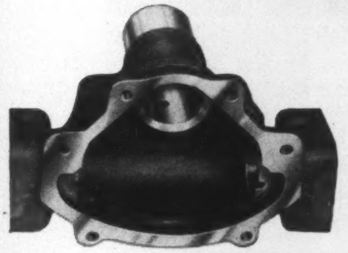
product improvement

and **cost reduction**

NATIONAL HTM CASTINGS

are the answer

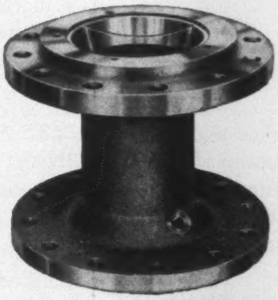


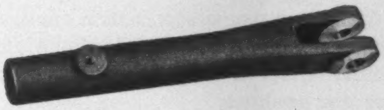


HTM is strength . . . toughness . . . wear and fatigue resistance . . . non-seizing. HTM is higher machinability than B1112 steel . . . it's closer as-cast tolerances that can reduce or wipe out machining operations.

If you're reappraising your product from a competitive point of view . . . if you're looking for production economies—look into HTM castings. Yes, HTM is many things—and it's just made to order for many mass-produced products just like yours.

A-1151A





HTM (Pearlitic Malleable) is many things—and they all add up to a *better product at lower finished cost.*

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The nation's largest independent producer of malleable and pearlitic malleable

LITHIUM: FLYWEIGHT HERCULES

Add

10% or more lithium to magnesium and you've got the highest strength-to-weight ratio of any known system.

Add about 1% of lithium to aluminum and you get a new alloy that's 3% lighter, has an 8% higher modulus of expansion, and retains structural strength at 30% higher temperatures than conventional aluminum alloys.

Or you can add minute quantities of lithium, the lightest metal, to lead, one of the heaviest, for a tougher, lighter, harder, stronger alloy with improved founding qualities.

What would happen if you added lithium to your favorite metal? This kind of curiosity has led researchers to publish some three hundred references discussing the resulting alloys with just about every non-ferrous metal mentioned in the periodic table, from arsenic to old zinc.

The references have recently been compiled by Foote, and this definitive bibliography is available to you on request. Write **FOOTE** Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pa.

(Continued from P. 76)

appointed manager of the division in the special Sales Dept.

R. V. D. Campbell, promoted to director, research, Burroughs Corp.

Robert Gale, promoted to purchasing agent, Marion Div., Eaton Manufacturing Co., Marion, O.

Electricweld Tube Div., Jones & Laughlin Steel Corp. — **J. L. Tomaselli,** appointed Division industrial engineer.

OBITUARIES

D. F. Hulgrave, 71, retired director, procurement and schedules, General Motors Corp.

R. C. Lassiat, 63, engineering consultant on catalytic oil refining methods, Sun Oil Co.

P. P. Huffard, 72, former director and vice president, Union Carbide Corp.

T. C. Ham, 86, sales executive, Philadelphia office, Jones & Laughlin Steel Co.

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- Is a big "buyer's market" in housing coming up?
- What amazing new atomic devices are American scientists developing?
- What's the short-range, long-range, outlook for business? For employment?
- Is there any truth in the talk of a deep 1961 recession? Which areas should you watch closely for trends?
- What crucial problems will the new administration act on first?
- What's best in new books, movies, plays, TV shows?
- What are the Russians up to? Are they trying to wreck the U.N.?
- How will small nations use their new bloc power in the U.N.?
- Will Congressional probes bring down drug prices?
- Are our overseas bases now obsolete?
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In instance after instance, all across the country, manufacturers have reported cutting hours off daily downtime, easing storage and handling problems . . . *increasing production as much as 50%* . . . after they started using CF&I Steel Wire — Packaged for Your Production.

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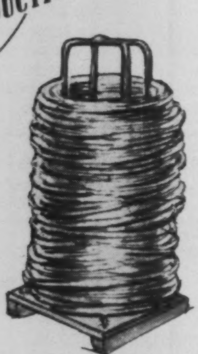

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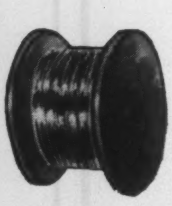
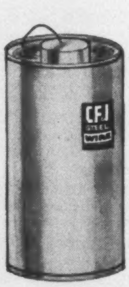
Capacity—500-1000 lbs.

Customer Report—
"50% increase in production since we started using Stem-Paks."



DISPOSABLE SPOOLS
Capacity—5-70 lbs.

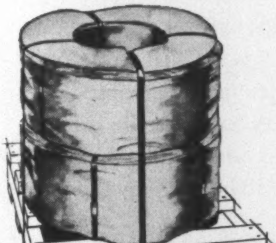
Customer Report—
"Easy to handle and store... quick to put in operation."



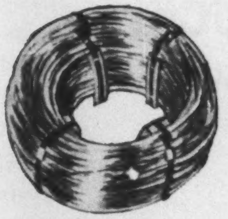
FIBRE DRUMS
Capacity—250-600 lbs.

Customer Report—
"Wire protected from dust, rust and corrosive fumes. Easier handling, storage, inventory."

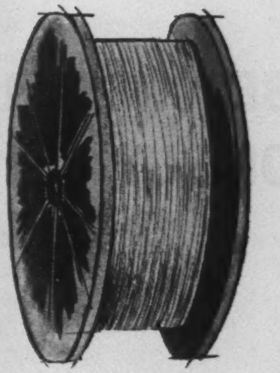
RETURNABLE SPIDERS: Capacity — 2000-3000 lbs. Customer Report —
"25% increase in production, 20% less downtime and 80% less scrap loss with the long, uninterrupted pay-off of these returnable spiders." CF&I produces top quality wire in thousands of different types, sizes, shapes and finishes to meet all types of wire applications.



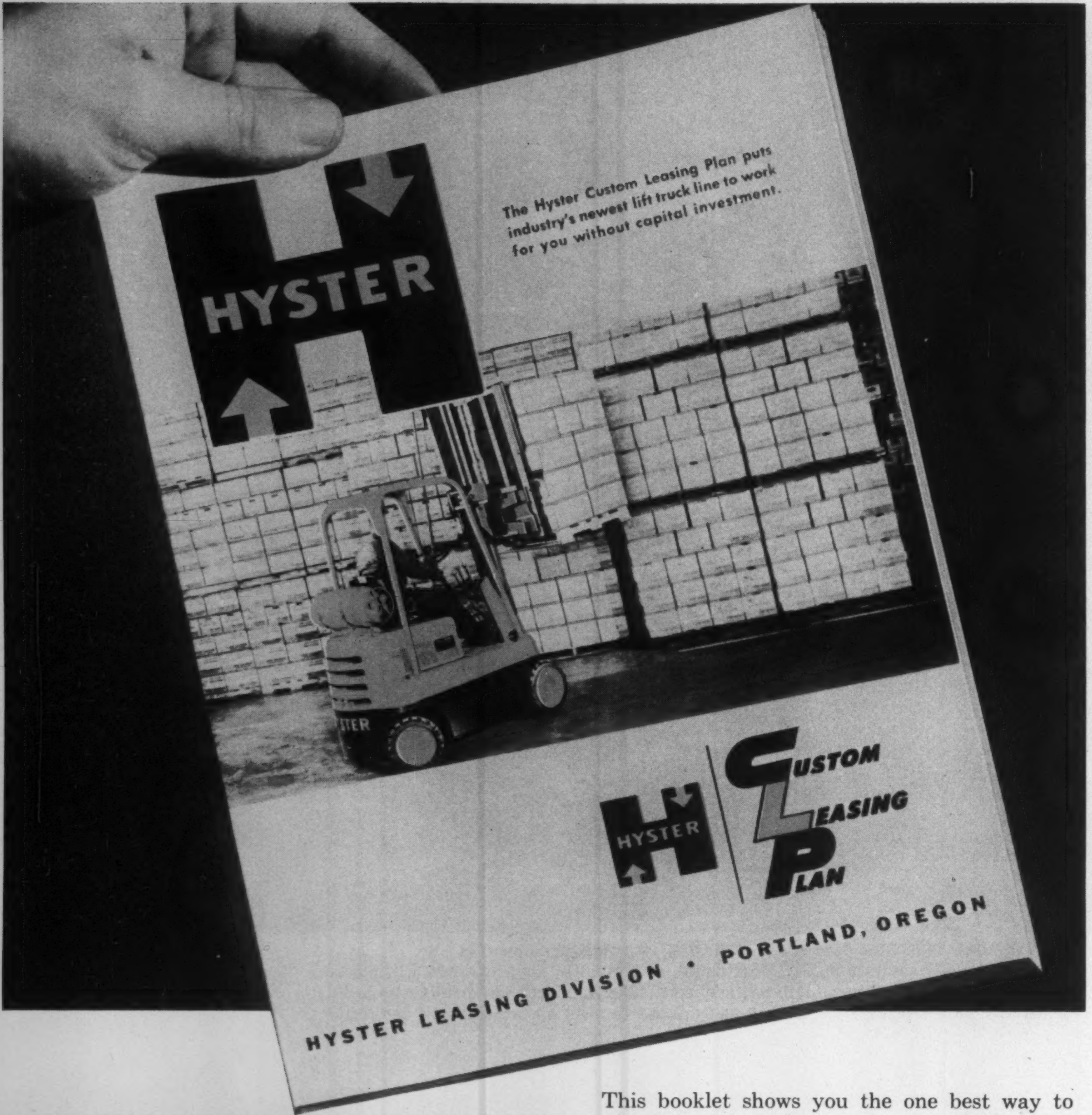
REEL-LESS CORES
Capacity—800-1000 lbs.
Customer Report—
"Easier handling, less storage problems and lower freight handling charges."



SHAPED COILS
Capacity—1500-2500 lbs.
Customer Report—
"20% increased production with longer runs, plus easier storage and reduced handling costs."



RETURNABLE STEEL REELS
Capacity—500-800 lbs.
Customer Report—
"Holds six times the wire as standard coils. Smoother pay-off, less scrap loss, easier shipping."



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The Hyster Custom Leasing Plan puts industry's newest lift truck line to work for you without capital investment.

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Boost Nike-Zeus Program

The Army is trying to work the Nike-Zeus anti-missile missile into a big spot in the budget of President-elect Kennedy. Army spokesmen are talking up the Nike-Zeus both in and out of the Pentagon. They claim it's ready for production. Kennedy looks favorably on new missile projects. The President-elect would probably go for the Nike-Zeus, if it can be proved an effective missile killer.

Detects "Hot" Aircraft

A new infrared scanning device is so sensitive that it can pick up the exhaust of jet aircraft at a distance of several miles. The new device can be used to detect enemy missiles or airplanes. But, John Mihalic, Avco Corp. vice-president points out that the unit can also be adapted for a number of industrial uses. It can be made in a size weighing as little as 40 lb to record heat-emitting objects.

Studies Thin Metal Films

Two Air Force reports, just released to science and industry, include data on the corrosion behavior of more than 1100 thin metal films. The purpose of the studies is to determine the potential use of iron, iron-copper, manganese and magnesium films as corrosion indicators for the protection of packaged material.

Strength Ratios to Rise?

Advancing thrust ratings in the solid propellant fields are forcing missile fabricators to boost the tensile strength of existing casings for Minuteman-size missiles. Projects are getting underway this month to produce higher-strength steel casings. This field is one to watch for announcements in the near future claiming unprecedented strength to weight ratios for steel.

To Produce Extreme Thrust

Design studies on very powerful solid booster vehicles are being started by Aerojet-General. These boosters would be many times larger and produce thrust levels far greater than any solid vehicle now in use in the United States. Commenting on the new NASA contract, E. R. Roberts of Aerojet said, "NASA's decision to study super-size rocket boosters with multi-million pounds of thrust could substantially reduce the cost of significant space explorations."

Which Metals for Moon?

The Army Corps of Engineers is planning to set up a simulated moon environment. The idea is to see what type of construction would be needed for building there. The Corps is paying particular attention to which types of metals can best withstand adverse moon conditions, particularly the quick changes of heat and cold.

Gives Tips On Die Steels

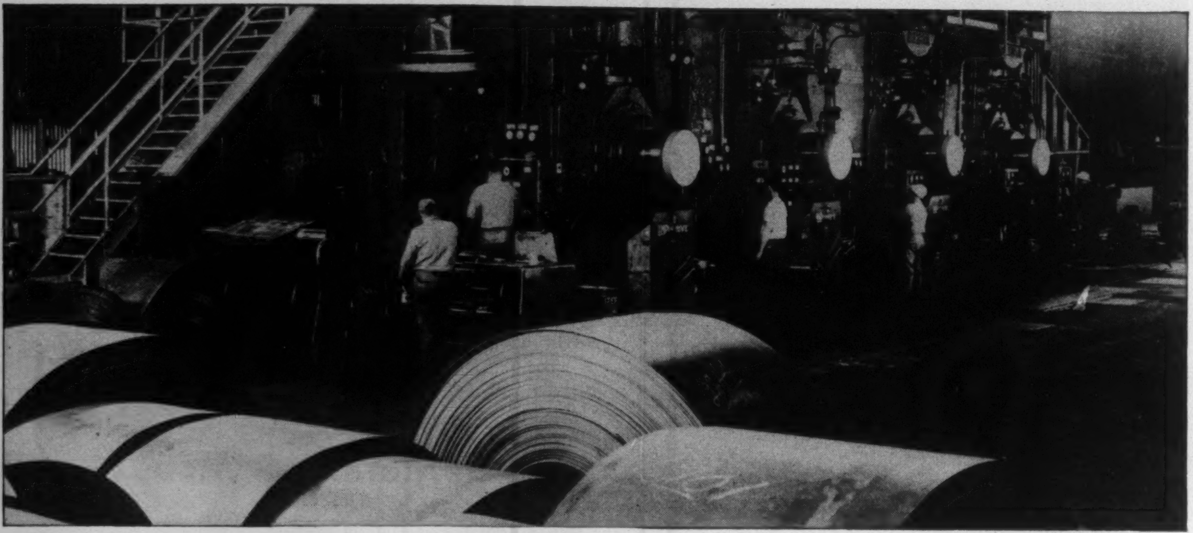
Hot-work die steels have many traits that suggest their use in aircraft and missiles. How to design with these steels is the subject of a recent Defense Metals Information Center report. Along with design data, a number of specific recommendations are given for working with these metals. Included are tips on forging, annealing, welding, machining, and cleaning.

Cuts Transformer Weight

Research on cobalt-base alloys reveals some very interesting combinations of magnetic and strength properties. One alloy, in particular, is a leading contender for space travel applications. It should provide great weight and size savings for transformers, modulators, and filter chokes.

Liquid Metals Give Power

Continuous hour-long runs with a liquid-metal fuel cell point the way to its use for space-age electrical systems. Because it has no moving parts, such a system may fulfill the very high reliability standards needed. Fuel cells operate on the same principle as a flashlight battery. But while the battery wears out, a fuel cell can be made to operate for years. All it needs is a constant heat source.



Four stand cold strip mill of Granite City Steel Company, Illinois. One of the most powerful tandem cold reduction mills in the U.S.

Heppenstall Sleeve #1727

was in the mill

89 times... and rolled

921,863 tons

At Granite City Steel Company...

Not every sleeve can roll a record... regardless of who makes it. But Heppenstall and Midvale-Heppenstall Sleeves have helped raise some *averages*, too, and that's what we'd like to do for *you.*

Heppenstall and Midvale-Heppenstall Back-Up Roll Sleeves reflect the long experience of two pioneer sleeve producers. Each sleeve's working surface is *tempered to meet your exact hardness specification.*

These mandrell-forged sleeves—made from highest quality alloy steel—are worked thoroughly under modern hydraulic presses to produce a finished product having both maximum density and grain refinement. They offer you exactness of fit and greater resistance to cracking and spalling during high-speed rolling.

Heppenstall and Midvale-Heppenstall also produce forged arbors... and have facilities to grind both arbors and sleeves for perfect shrink-fitting.

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MIDVALE-HEPPENSTALL COMPANY NICETOWN, PHILADELPHIA 40, PA.

Die Blocks • Forgings • Back-Up Roll Sleeves • Rings
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Vacuum and Consumable Electrode Melted Steels

Can Explosive Forming Solve Your Design Problems?

By **E. L. Armstrong,** Senior Research Engr., Special Projects, Rocketdyne, a div. of North American Aviation, Inc., Canoga Park, Calif.

Using explosives, it's possible to trim and shape a part to size with a single blast.

Explosives may be the answer to your cladding, forming, cutting and trimming needs.

▪ In research and development work, the use of complex dies proves costly. Prototypes are often very difficult to form by conventional methods. Naturally, this causes production delays. However, there's a way around this bottleneck.

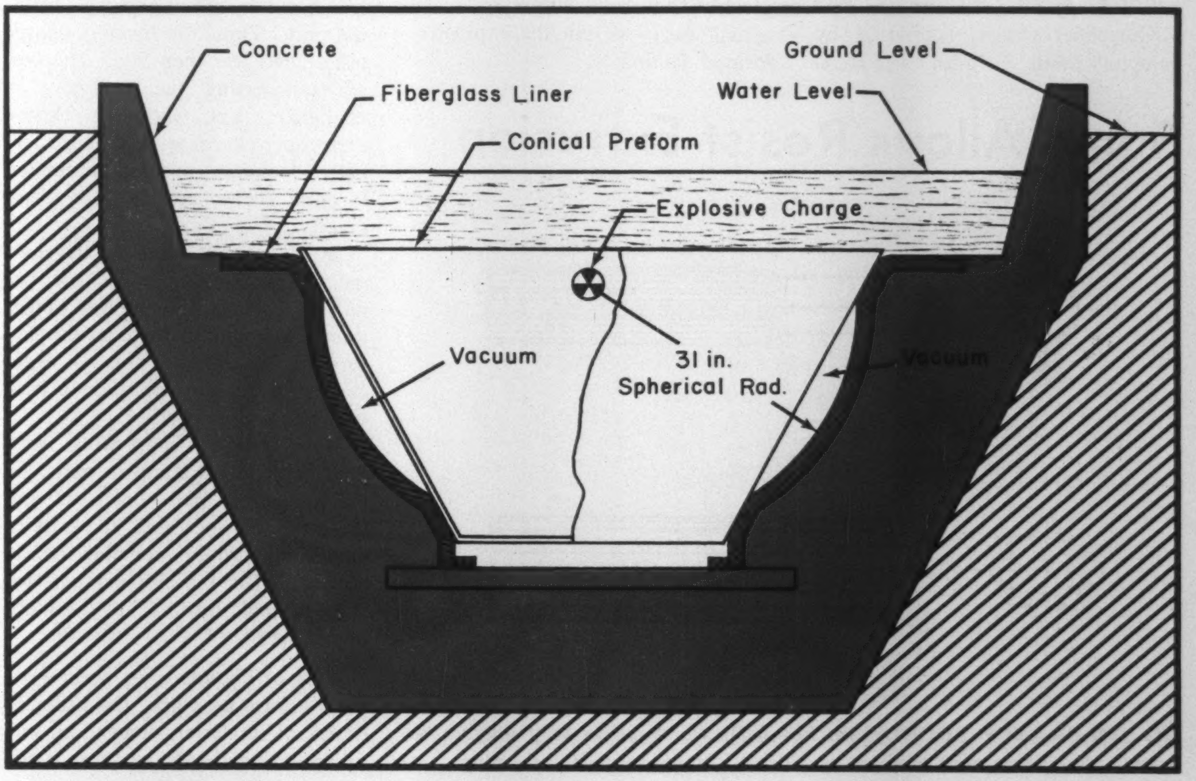
The jam breaker centers on high-energy forming with explosives. An explosive charge weighing less than a pound yields pressures up to several million pounds per square inch. Precisely controlled, these pressures range from very high to very low values.

Dual Service — Each charge serves a dual role. It replaces both forging press and male die. Thus, when you design for explosive forming, you speed prototype and final-run fabrication while reducing research costs.

Forming with explosives lessens the danger of spring-back or work-hardening of the formed part. This cuts down on the need for costly, time-consuming annealing operations.

Metallurgical tests show that ex-

How Rocket-Missile Tanks Are Formed



plosive forming, with proper control, has no adverse effect on microstructures or hardness values.

Many of the new high-temperature, high-strength alloys are virtually unformable with present general methods. Explosives, on the other hand, readily form these wonder metals without altering desirable properties.

Plenty of Experience—For years, Rocketdyne has performed basic explosive-forming research. Most of this research is conducted at the Propulsion Field Lab, located at a remote site in the Santa Susana Mountains near Canoga Park, Calif. This 2000-acre complex is the Free World's largest rocket-development and testing installation. It's also the site of the extensive facilities of Rocketdyne's Research Dept.

Many part sizes, shapes and materials have been explosive formed at this site. High-energy explosive charges shape parts made from both metals and plastics. Among the metals successfully formed are: titanium, zirconium, stainless 15-7 Mo, aluminum, tool steels, Rene 41 and space metal.

Current research, supported by company funds, includes basic studies to explain high-energy forming behavior, die design, forming of plastics and the forming of high-strength, high-temperature advanced metals. The latter metals fall in the refractory metal group.

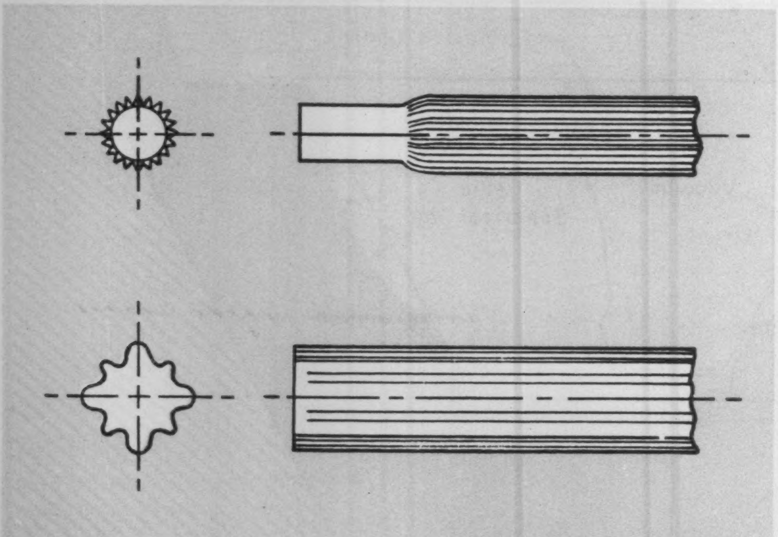
Wide Success — Rocketdyne's success in this program has already led to the production forming of numerous parts for other North American Aviation divisions. Controlled blasts produce exacting parts for airframes, missiles and atomic-energy needs.

Explosives also serve to bond similar and dissimilar materials together. Using this method, Rocketdyne bonds copper to copper and stainless steel to aluminum. Stainless steel has also been bonded to itself, then clad with aluminum.

Aluminum laminates, 0.06 in. thick are readily formed to close tolerances with explosive charges. Each laminate consists of several sheets of 0.01-in. aluminum, bonded together to form a complete assembly.

Conventional methods of forming result in sheet fractures or bond failures. This isn't true when explosives are used. Severe tests and actual use prove out the explosive-formed laminates.

Some Alloys Resist Extrusion



NO TOLERANCE PROBLEMS: For parts which prove very difficult to extrude, due to material or shape, explosive forming serves to advantage.

Design Considerations—Probably the most important item for any designer considering high-energy forming is the explosive charge. Consider the explosive as merely a source of energy. You can compare it to a forging press.

However, due to the nature of explosives, the energy source is highly concentrated. On a small part, a 2-oz charge performs the work of a 10-ton press. Furthermore, the tiny charge fits into a very small space. It occupies an area of about 0.1-in. ID to handle this work.

This size factor is important. It means that it's no longer necessary to work on a part from the machine side only. The explosive can be placed in almost any location to form the part as desired.

No longer is it necessary to build a male die that fits into a forming press. As a result, savings in both time and costs mushroom. Explosives also preclude quite a bit of materials handling. You don't have to transport dies and workpieces to a forming machine.

Savings Multiply—Cost savings are even more impressive. Generally less than a pound of explosive forms the part. Thus, the forming charge often costs less then 50¢. The cost of transporting the explosive is negligible. Yet, when you choose the proper charge weight, shape and blast location, almost unlimited forming forces are at your command.

In its present state of development, the forming cycle for explosive forming is sometimes longer than that required for conventional forming machines. This is especially true for long production runs of small, simple parts.

Now, consider short work runs. And don't forget complex parts. As the number of parts decreases and the part size increases, the cost of explosive forming remains nearly constant. But the cost per part for conventional forming increases appreciably.

Rule of Thumb—For normal explosive-forming work, the ordinary limits of material elongation and minimum bend radii serve as a rule of thumb. Material thinout resembles that obtained with conventional forming methods, except that with explosives more control is possible.

Often, when forming with explosives, it's possible to gather material or to apply more uniform pressure on a workpiece. This makes it easy to reduce thinout on a deep part. It also aids in making parts which are nearly uniform in thickness.

Explosives are readily adapted for part trimming and for making cut outs on large parts. It's possible to obtain any type or shape of trimming during the forming cycle. With large parts, the charge is placed inside the part.

Explosive energy cuts the metal in a manner that's similar to the blanking of flat sheets. Size of the cutout is immaterial.

Eliminate Spinning—Symmetrical parts often prove difficult to spin because of material, configuration or tolerances. Explosive forming offers a solution to this design problem. And when such parts are formed with explosives, the reject rate tumbles.

Unsymmetrical parts, having any number of projections or indentations, may be explosive formed by altering the single female die to match your design needs.

Normal tolerances for explosive forming are on the order of 1/32 in. With these close tolerances, parts can be formed rapidly and easily. Closer tolerances, down to 0.001 in., are also easily obtained; but these tolerances depend upon longer forming cycles and better dies.

In bulging operations, one of two choices is open to the designer. If a part has enough draft to allow removal from a one-piece female die, forming becomes very simple. In such a case, die cost also tumbles.

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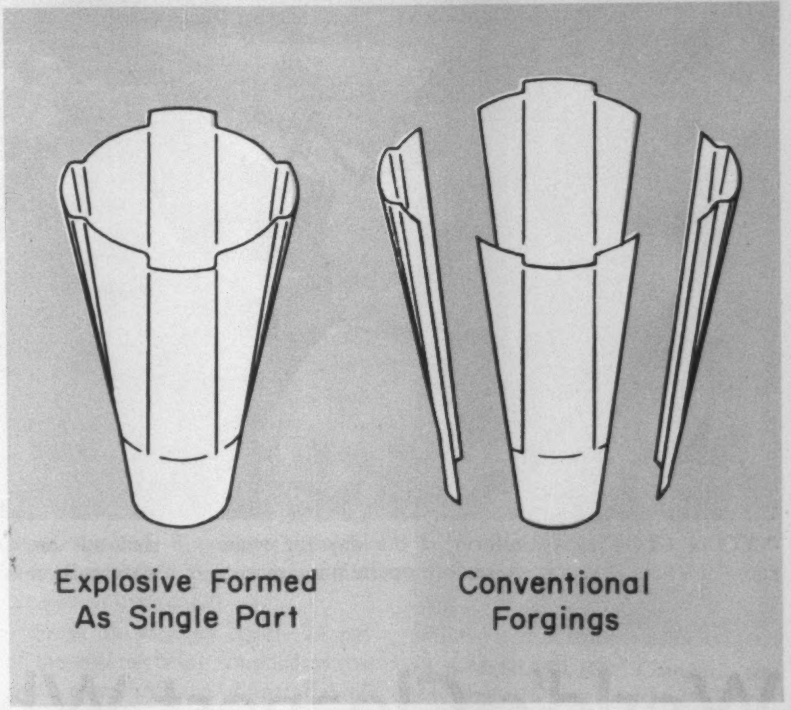
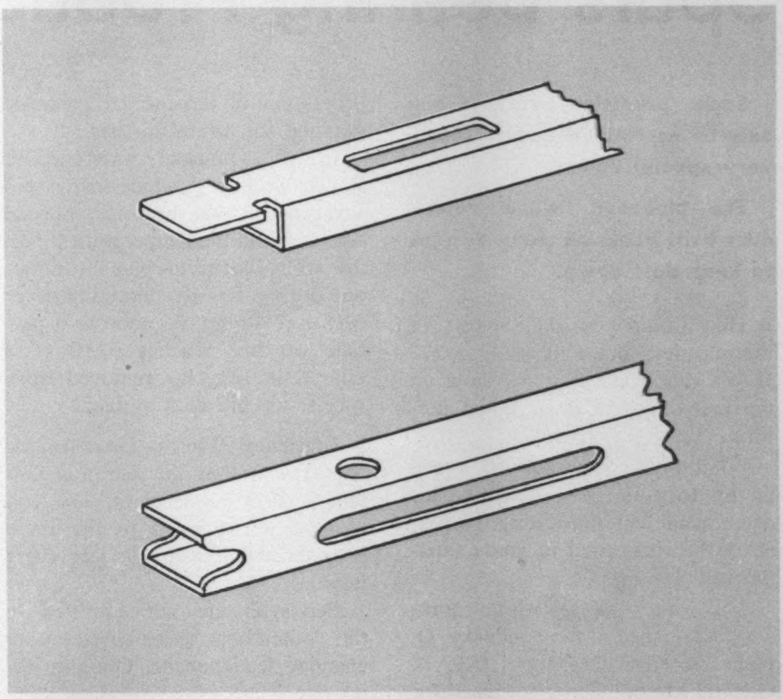
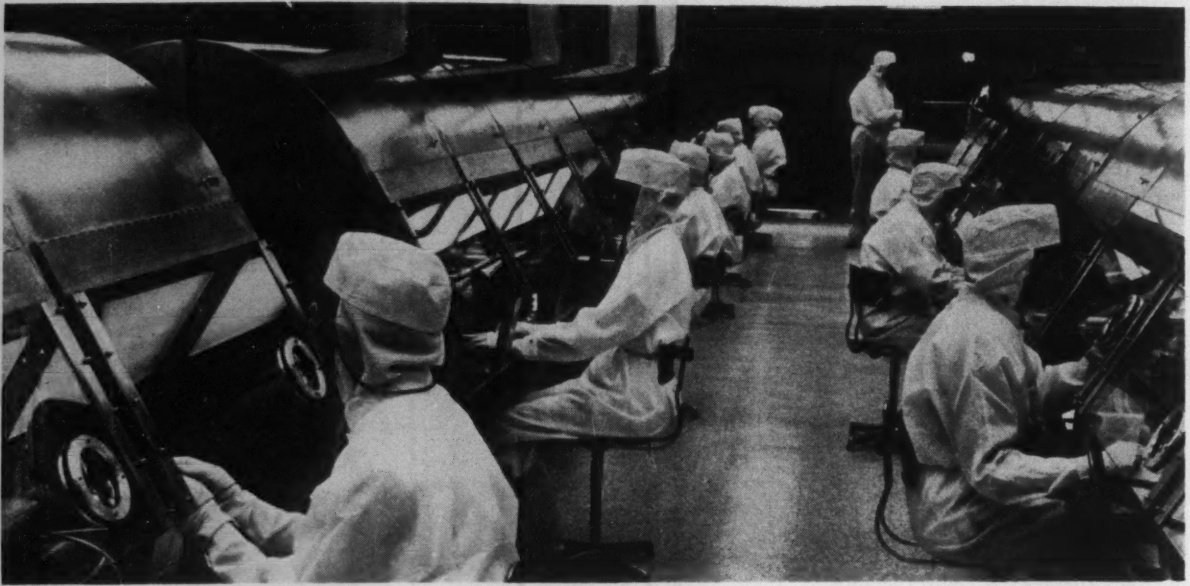
Eliminate Assembly Expenses



Blast Trims and Punches Part



SINGLE BLAST: The part shown at the top of the sketch was made from a ¼-in. diam tube. It was squared and trimmed with a single blast.



NYLON CLOTHES: Uniform of the day for white room workers is nylon. Assembly operations are carried out on such crucial parts for missile guidance systems as miniature and instrument ball bearings.

World's Cleanest White Room Spurs Bearing Production

Super precision bearings can only be assembled and tested in very special rooms.

The cleanest "white room" ever built banks on many designs to keep dust down.

▪ How would you like to work in the cleanest office in the world? If you did, you'd have to show up the first day in a white nylon uniform.

What would your job be? You'd be up to your neck in the space age, assembling and testing the precision bearings used to guide satellite vehicles.

The whitest of all white rooms was just opened at the Sandusky, O. plant of New Departure Div. of General Motors Corp. The need for a cleaner facility became apparent when the company started to build prototypes of the inertial guidance bearings for future missiles.

In this unusual environment, skilled workers produce many spin axis and gimbal bearings. Special controls hold the temperature within the white room to plus or minus one degree. Relative humidity never gets over 40 pct. As soon as a particle of dust reaches 3/10 of a micron in size, it's removed by a special air filtration system.

Efficiency Plus — Discoloration tests reveal that the filtration system is 99.9 pct efficient. The volume of air supplied to the room goes through 20 air changes every hour.

Personnel are not admitted to the white room using cosmetics or carrying lead pencils. Once inside, no one is permitted to chew gum, eat food or smoke. In addition, only special lint-free data paper can be used. The nylon clothing, including coveralls, hoods, gloves and boots, is specially treated to resist static electricity.

The most revealing feature of New Departure's latest white room is the number of innovations that have gone into its design. For example, glare at the work level has been eliminated. This is done by maintaining the lighting in that area in excess of 200 foot candles and diffusing the light through plastic, prismatic lenses.

Interior Design—Another white room "first" concerns architecture. Except for door jambs and headers, there are no right angle intersections of surfaces. Ceiling and floor surfaces are coved into walls and partitions in sweeping radii.

All vertical intersections are broken on 45° or flatter angles. Streamlined-edge stainless battens close the joints at panel and window junctions.

Also, all vertical walls and partitions are stainless or plate glass. All trim is stainless, too. All steel is copper-wire grounded to discourage static. Copper grounding is hidden behind streamlined stainless moldings. They cover the junction of the floor coves to the partitions.

Plumb Line—Vertical walls and partitions lean into the cleanest areas at about 3° off plumb. This design aspect deters dust from adhering. It also deflects any glare reflected from the high illumination level and the polished stainless surfaces.

Partitions are single thickness. They have no studding nor other framing. Stainless-clad plywood and plate glass are self-supporting from structural steel floor curbs to ceiling members. Adjoining rooms are heated to the same temperature as the white room, so there's no need for thermal insulation in the partitions.

Tempered plate glass doors don't have frames. Each door is fitted with pivots and closing devices flush with casing headers and floor. As such, there are no moldings and ledges to entrap even minor amounts of dirt.

Stainless Buttons—Even screwheads are covered with stainless buttons that blend them into flat surfaces. No dust-collecting crevice has been overlooked. Those joints that could not be butted tightly receive smooth fillings of plastic metal.

There are other features that might be found in other white rooms, but not very often. One is the introduction of ventilation at the ceiling. Return grilles are located as close to the floor as possible. Air-borne contaminants are thus forced downward.

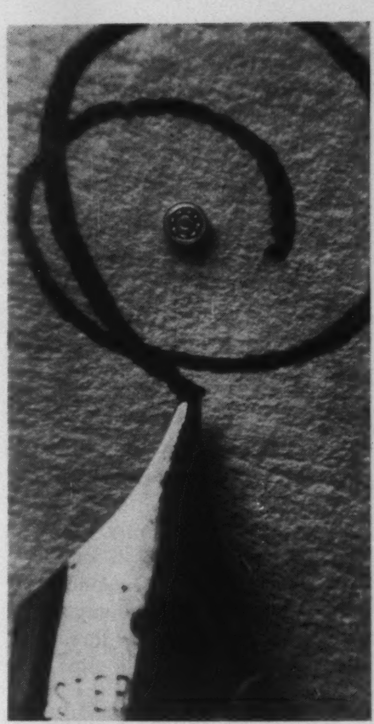
Filtration air is supplied to stainless "Sterilshield" work spaces. Here, products are assembled, tested and packaged. An evenly-distributed outward flow of this filtered air is assured at 40 fpm through the entire access opening of the Sterilshield.

By designing the height of the ceiling to a limit of 8 ft, there's less air to be conditioned. Ceiling surfaces are covered with a vinyl sheet material, making butt joints almost invisible. The vinyl material on the floor is not static conductive. This implies that if dust is held to any surface by static influence, it should be to the floor.

The Maintenance Man—At New Departure, they don't have to worry about the maintenance man coming in to fix the lights. Lighting fixtures are above the lenses, and they're sealed flush with the ceiling. Maintenance, therefore, is done from above.

No attempt has been made to seal the doors or to provide air locks. Instead, a positive pressure is maintained in the room so that air flow is outward.

Fresh air makeup equals 25 pct of the volume being supplied to the work areas. Also, a differential of 0.05 in. water pressure is maintained between successive areas.



SUB-MINIATURE: Compare the tiny size of a precision bearing (less than 0.047 in. OD) with the typical markings from a fountain pen.

CRITICAL CHECK: A standard job in the white room is the gaging of the cross curvatures of instrument ball-bearing rings for missiles.

Buttress-Threaded Tube Ends Raise Coupler-Joint Efficiency

There is always a need for stronger tube coupling methods.

A new thread development helps to couple joints faster than older methods and increases its tensile strength.

▪ Probably the best way to sell a product is to perfect its end use. And that's just what engineers at many companies are doing. The most recent find is a new thread design for oil-country drill pipe. It's called a buttress thread.

The special thread designed to meet the oil industries' growing needs may also fill the bill on a tough fit up job you may have. The new thread is rugged. Its buttressed side differs from older tubing thread which was triangularly symmetrical.

The buttress thread requires new manufacturing methods, one of which eliminates internal and external upsetting or thickening of the tube ends. The upset tube ends gave added strength to the tube length but only with an equal sacrifice of space within a casing.

In contrast, the buttress-threaded tube ends not only offer better clearance than upset ends, but also the joint tensile strength is higher.

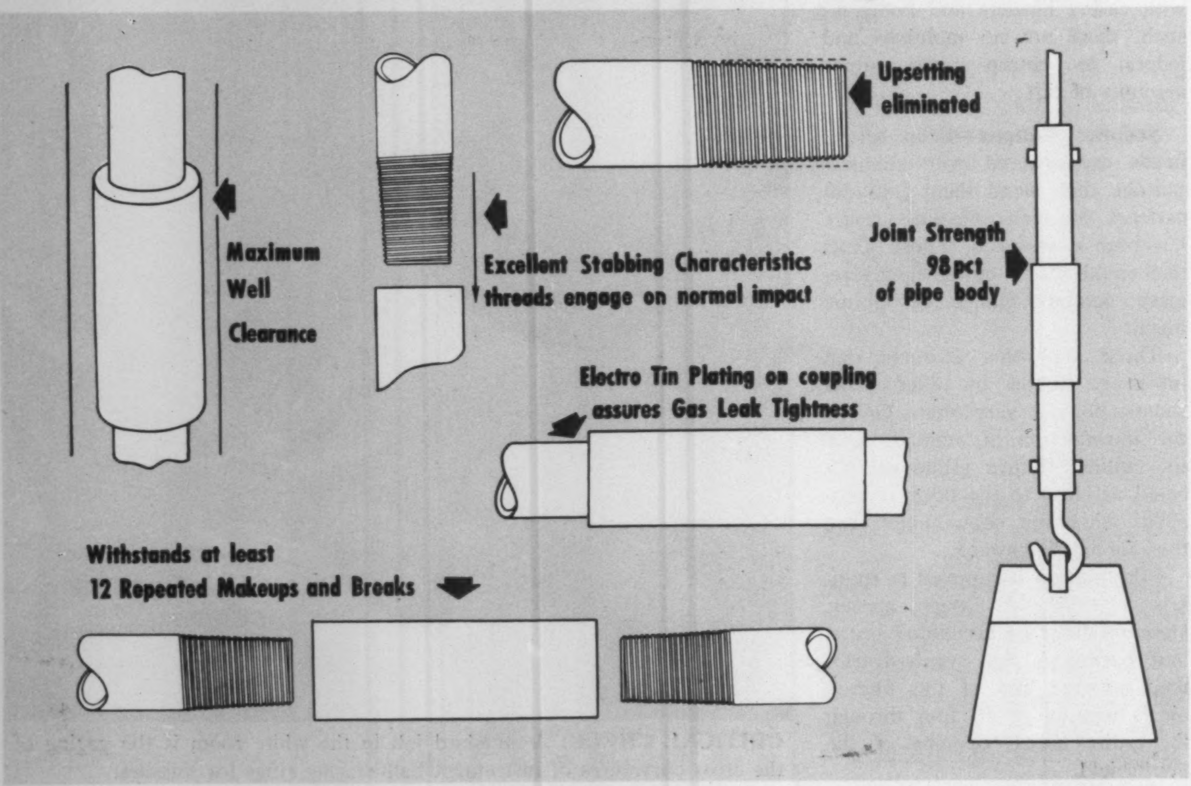
Connects Quickly — Tube and couplings are stabbed together by normal drop impacts without thread damage or cross-threading—much in the same way a freight train is coupled.

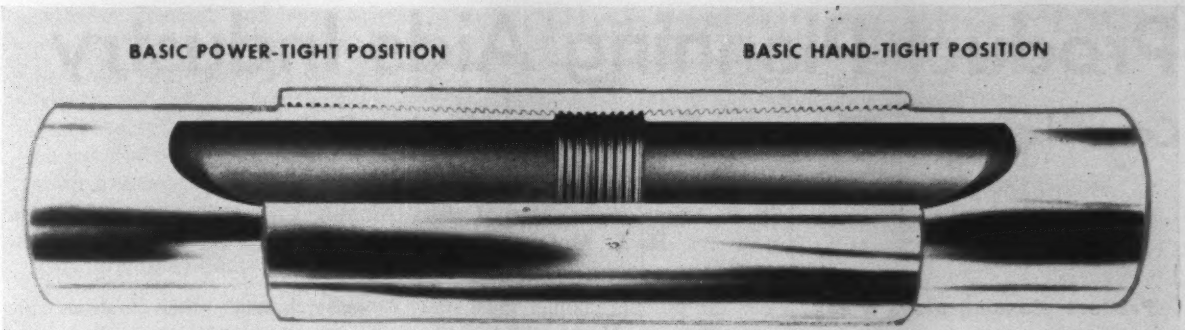
Should the threads become damaged for some reason, the tube can be removed and rethreaded on the spot. The older upset joints had to be hauled back to the process mill for repair.

The new tube-coupling joints can be assembled and broke up to 12 times without any sign of damage such as thread breaks or galling.

Joint Strength—The joint is almost as strong as the tube body.

Buttress-Threads Raise Joint Strength


Upsetting eliminated
Maximum Well Clearance
Excellent Stabbing Characteristics threads engage on normal impact
Joint Strength 98 pct of pipe body
Electro Tin Plating on coupling assures Gas Leak Tightness
Withstands at least 12 Repeated Makeups and Breaks



FASTER MAKE-UP: Tapered tubing slips easily into the coupling until the flat crested threads engage. This is done without twisting either component to permit faster joint make-up for maximum running speed.

It tallies out to about 98 pct of the tube body strength.

One factor that adds up to a stronger joint is its thread form. The threads have a 0° pulling face and a 45° flank angle on the compression side. Its broad-flat roots and crests parallel the major axis of the tube.

The buttress-threaded couplings are tin plated to assure maximum protection against leaks. Tin plated joints withstand pressures up to 15,000 psi and reduce make-up torque. Plating thickness averages to about 0.0020 in.

Meets Challenge—Until now the highest tensile strength offered by a non-upset API tube joint was 75 pct of the tubing body. U. S. Steel's National Tube Div., developer of the buttress thread for casing joints, met the challenge.

The result was a new joint, designed for maximum clearance, high tensile and compression strength, gas-leak tightness and the ability to withstand 12 repeated make-ups and breaks.

With oilmen drilling to greater depths than ever before, the new joint design will handle the added forces placed against it.

Receives Test—To show the performance of this joint when subjected to thermal cycling under high gas pressure, test joints were immersed in a water bath to step up leak detection. The water also provides a means for cycling at controlled temperatures. These range from 60° to 200°F.

During the test, pressures varied from 7800 psi to 8300 psi, the latter are 95 pct of the minimum yield pressure of the J-55 grade tubing. In the P-105 grade tests the pressure varied from 14,600-15,400 psi with the maximum being 92 pct of the minimum yield pressure.

During the cycle tests, the gas pressure was reduced to atmospheric and then returned to maximum at least three times. The high pressure was held for 25 hours on each test.

None of the joints leaked during this test. This includes specimens which had, prior to testing, been subjected to twelve repeated make-ups and breaks. This excellent gas-leak resistance is ascribed to the thread tolerance, long thread length, and the heavy tin plating.

The buttress-threaded tube is the result of extensive research and practical application. The joint will provide greater clearance between tubing and casing in multiple completion oil wells.

CHECKS QUALITY: A visual comparator is used to keep threads in line with standards. Thread taper is checked with a gage micrometer.

Product Planning Aids Industry

Controls Reduce Risks in Developing Major Products

By **E. Karns**—Sales Mgr., Cessna Aircraft Co., Hutchinson, Kan. and
H. T. McGee—Marketing Mgr., Dynex Inc., Pewaukee, Wis.

Product planning plays a key role in corporate-product aims.

It can spell the difference between profit and loss while pin pointing capital expenses.

▪ Product planning serves a vital role in industry. However, it's only a single factor in developing a sound corporate-product program. Therefore, any discussion of product planning must include some reference to overall corporate strategy and its function.

Most corporate objectives cover a wide range of markets. But the product planner's work is normally confined to fixed areas. He has to fit certain products into his company's overall corporate-product pattern.

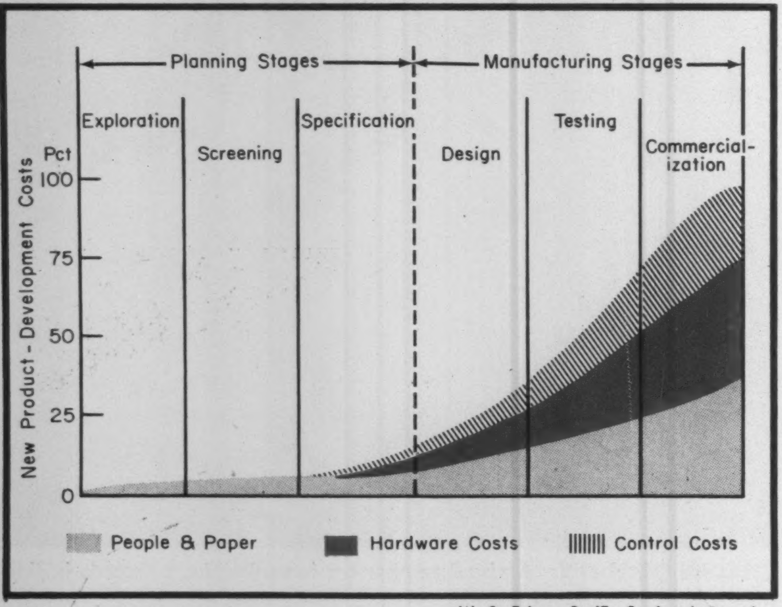
While examining any new product, the product planner must study many factors. He should ask himself the following questions.

Vital Questions—How big is the marketing area in regard to the selling price? Are there any ready markets and, if so, how does the competition shape up? Will the market be subject to seasonal fluctuation? How will the new product affect present customers. And what will be the potential growth, risk and return on investment?

Just as important are future production problems. The product planner must evaluate his company's knowledge of the new product. He should ask himself this double-edged question: Do we have the personnel and the equipment to make the new product?

When the product is still in the research stage, other questions must be answered. What is the capital investment needed? Can the company swing this development expense?

Evaluate Development Costs



W. S. Eckess, Pacific Semiconductors, Inc.

Along with development costs, other capital expenses have to be taken into consideration. How much will it cost to develop the market?

Of course for thorough planning, you must know all the facts about proprietary rights. Patent infringements become costly headaches.

Corner the Market? — Finally, you must predict the profit picture for the next five years. Is there a chance of dominating the market with the new product?

The product planner must act in the initial investigation stages. This is the easiest and cheapest place to say "no" to any of the preceding questions.

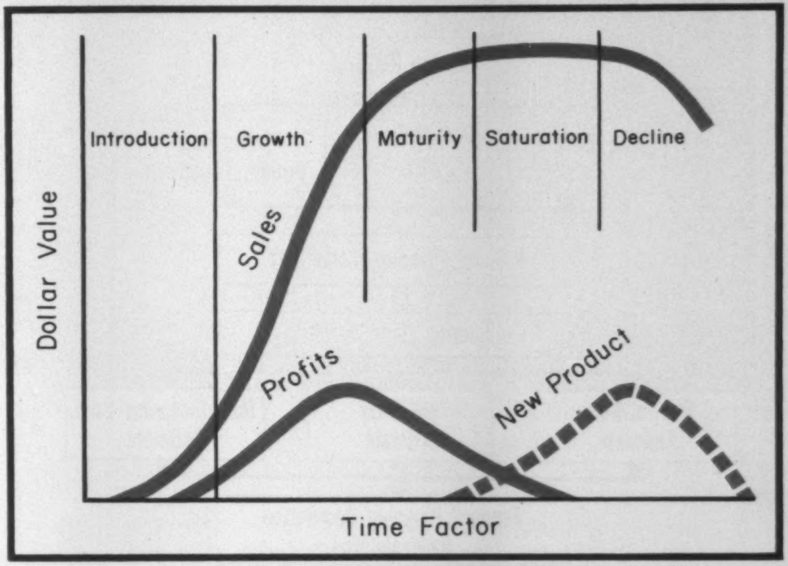
At the same time, he must realize that risk is an inherent factor in business operations. Business risks, and mainly those associated with product planning, aren't always viewed in their full perspective.

Product risk can, in fact, be arrayed in a wide spectrum. This spectrum ranges from readily acceptable products sold in a well-defined and well-developed market to radically different products that must pioneer new markets.

Product Birth—Most requests or ideas for new products are brought home by a salesman. Very often, the salesman has a customer with a new application that doesn't fit the present product line.

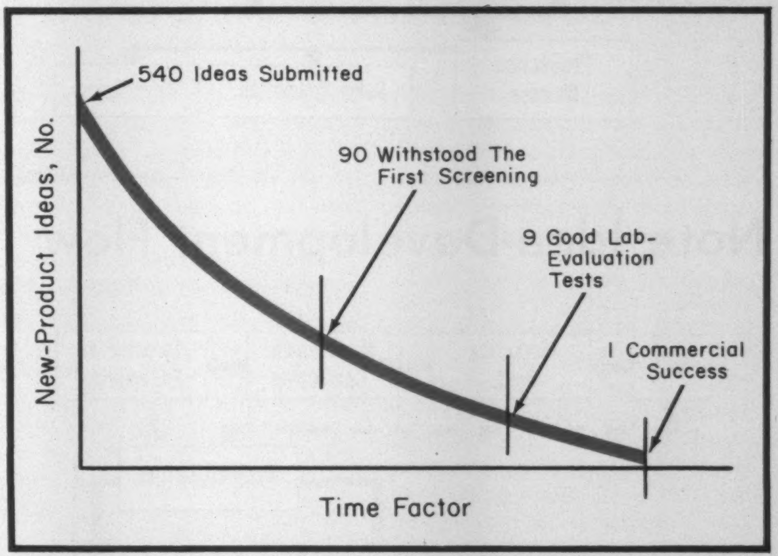
Sometimes, the engineering department originates ideas for new products. Other sources supply some ideas. However, ideas other than customer demand, and hence sales requests, are in the minority. All ideas can be handled in the same fashion.

Plot Evolution of a Product



Dr. P. D. V. Manning, International Minerals & Chemical Corp.

Idea Mortality Rate Is High



Dr. P. D. V. Manning, International Minerals & Chemical Corp.

A request for a new design should be submitted in writing. It should cover five categories. These include: package specifications, performance data, unit potential, price target and general pertinent data.

Analyze Ideas—Design requests next pass to an analysis group. This group hunts for other potentials than the original application. They estimate product life. At the same time, they check possible obsolescence of presently-produced products.

Final analysis centers on the adoption of specifications. An engineering estimate of development costs also proves useful.

If the design request seems feasible at this point, it and the analysis report pass on to a product-planning committee. This committee consists of at least three top-management people. Best suited for this work are the general manager, chief engineer and the sales manager.

At a regularly scheduled meeting, these three (or more) people review the data on hand. They then decide whether to continue the program or to drop it at this stage.

Schedule Development—Assuming product-planning-committee approval, the design request and potential analysis are forwarded to engineering. Now, the engineers estimate development costs. They also set up target-completion dates.

Upon completion of design, a complete package is passed to the cost-analysis people for further study. This package consists of the design request, potential analysis and design prints.

The cost-analysis department checks manufacturing costs along with tooling costs and amortization. They also gage capital-equipment costs and their amortization.

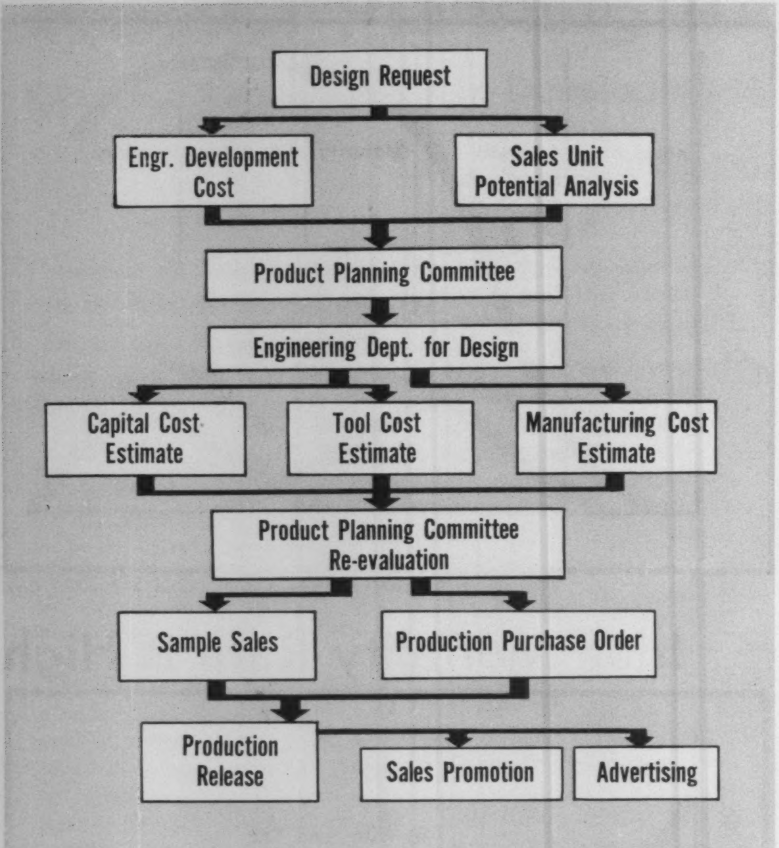
Second Evaluation — Next, the idea undergoes a second analysis. The entire package returns to the product-planning committee for re-evaluation. If the decision is again affirmative, the project is dropped in the sales manager's lap. At this point, the promotion of sample or pilot-run sales begins.

On a scheduled basis, salesmen return purchase orders for samples from enough potential customers to satisfy the product-planning committee and the sales manager. This action confirms the potential analysis of the planning committee.

The samples are made and distributed for the following purposes: engineering-performance tests; customer-performance tests; and customer acceptance and purchase-order placement.

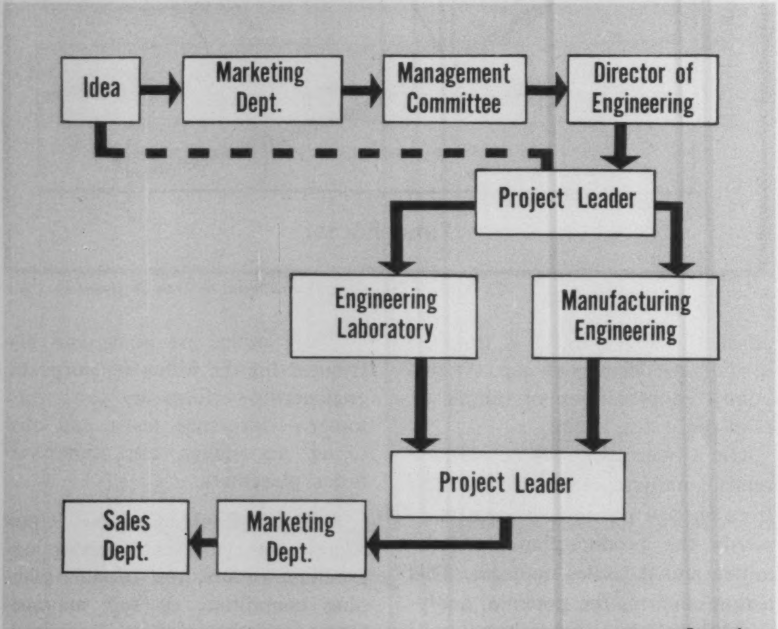
Release Production — Upon receipt of sufficient production-purchase orders, the product-planning committee, or top management, authorizes the spending need-

Design Requests Move Freely


Design Request
Engr. Development Cost
Sales Unit Potential Analysis
Product Planning Committee
Engineering Dept. for Design
Capital Cost Estimate
Tool Cost Estimate
Manufacturing Cost Estimate
Product Planning Committee Re-evaluation
Sample Sales
Production Purchase Order
Production Release
Sales Promotion
Advertising

Cessna Aircraft Co.

Note Idea-Development Flow


Idea
Marketing Dept.
Management Committee
Director of Engineering
Project Leader
Engineering Laboratory
Manufacturing Engineering
Project Leader
Sales Dept.
Marketing Dept.

Dynex Inc.

ed to begin production. Thus, the new product enters the business.

The steps illustrated in both the Cessna and Dynex approach may seem somewhat involved and time consuming. However, the success of a product-planning program hinges on the degree to which the completed projects satisfy corporate objectives.

The introduction of a new product at Dynex moves through seven distinct steps. These steps are idea creation, evaluation, evolution, application, commercialization, production and distribution.

Main Role — Product planning plays its main role in the third step. This step centers on evolution of a product.

Ideas for a new product at Dynex originate in any one of several places, including engineering, sales and marketing. Major primary new products are developed through the marketing department where they are evaluated. This insures that the specific product will fall within corporate objectives and facilities of finance, plant and personnel.

Any phase in the development of a product can present the newcomer in an unfavorable light in regard to corporate objectives. Therefore, controls at each phase must remain firm. Remember these controls reflect top-management decisions.

Experiences at both Cessna and Dynex show that in the development of a major product the risk is greatly increased if any of the steps are omitted. Failures are more apt to crop up when controls are bypassed.

Both companies view their product-planning procedures as vital to the future profit and direction of the company. Thus, major top-management time and consideration are given this element of their businesses.

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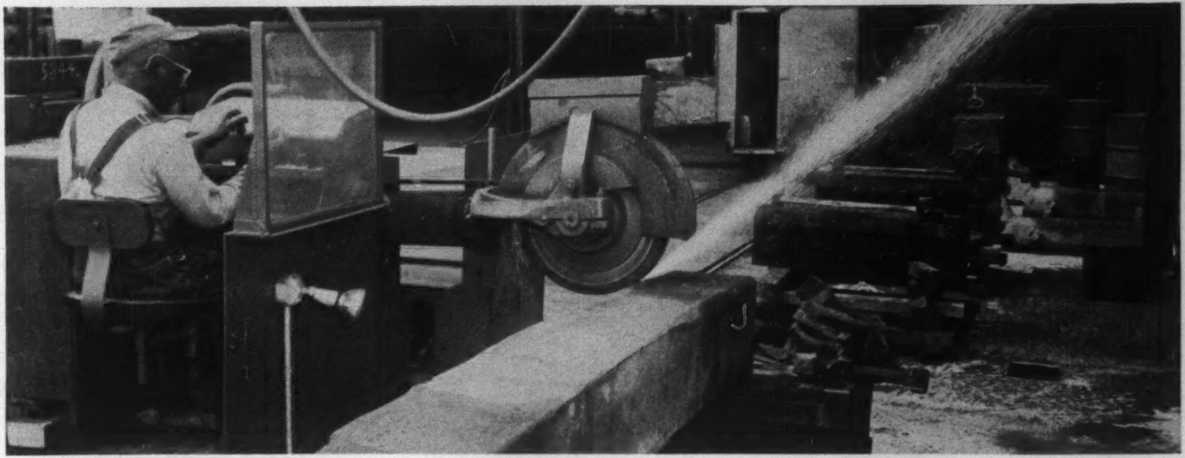

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Grinder Breaks Speed Barrier

Special Unit Grinds Stainless Slabs at 12,500 Sfpm

Stainless slabs require lots of conditioning before they're shipped to finishing mills.

A breakthrough in grinding promises to reduce conditioning time while boosting wheel service by about 50 pct.

▪ Stainless steel producers have broken through a speed barrier in their conditioning of slabs and other semifinished forms.

At least one producer has boosted grinding wheel speeds by 25 pct. Another is now converting all its grinding machines for faster rotation. Others are taking a close look.

Early reports on the new technique indicate a 25 pct efficiency gain. In addition, grinding wheel life has been extended and smoother operation is being obtained.

Major Savings—These gains add up to big money for stainless producers. One mill, alone, spends $7 million a year on grinding wheels. Reason for this is that stainless is given extensive conditioning before it goes to finishing mills.

At one time nearly all conditioning was done manually with swing grinders. Over the past five years, automatic grinding machines have taken over a big part of the job for slabs and other big semifinished forms. Until recently, the top speed for these machines was about 9500 sfpm.

About a year ago, tests at higher speeds were started at Green River Steel Co., a subsidiary of Jessop Steel Co. A new grinding head, made by Fox Grinders, Inc., was installed on a Midwest mechanical grinder.

For this job the Bay State Abrasive Products Co. supplied a hot-pressed wheel with special bonding.

Longer Service Life—The modified machine operates at 12,500 sfpm. Initially, it was run with a head force of 550 lb and a traverse rate of 70 fpm.

Results are noteworthy. Cutting rates increased 25 pct. Wheel life has been extended 25 pct. In terms of pounds removed, wheel service is up 50 pct.

In early tests, stock removal was relatively high. Working with expensive stainless, this was a critical matter. With further study, it was found that cutting depth could be reduced by reducing the head force and increasing the traverse speed.

Less Vibration — Contrary to what might have been expected, vibration decreased. The operation actually became smoother as speed was increased. This was attributed in part to the heavier head construction. However, the speed, itself, helped. Going over 12,000 sfpm, the grinding wheel seems to break through a vibration barrier.

Smoother and cooler operation shows up in wheel performance. Green River reports an absence of spalling, chipping and cracking in the new grinding wheels. Wheel-slippage problems are eliminated by the higher speeds. A special mounting device also reduces slippage.

According to one grinding-wheel man, the speed ceiling hasn't yet been reached for slab conditioning. He predicts speeds up to 16,000 sfpm in the near future.

Welders Work With Many Arcs From Single Power Source

Does welding production in your plant require that 10 men weld simultaneously in the same general area? If that's the case, look into multi-arc welding.

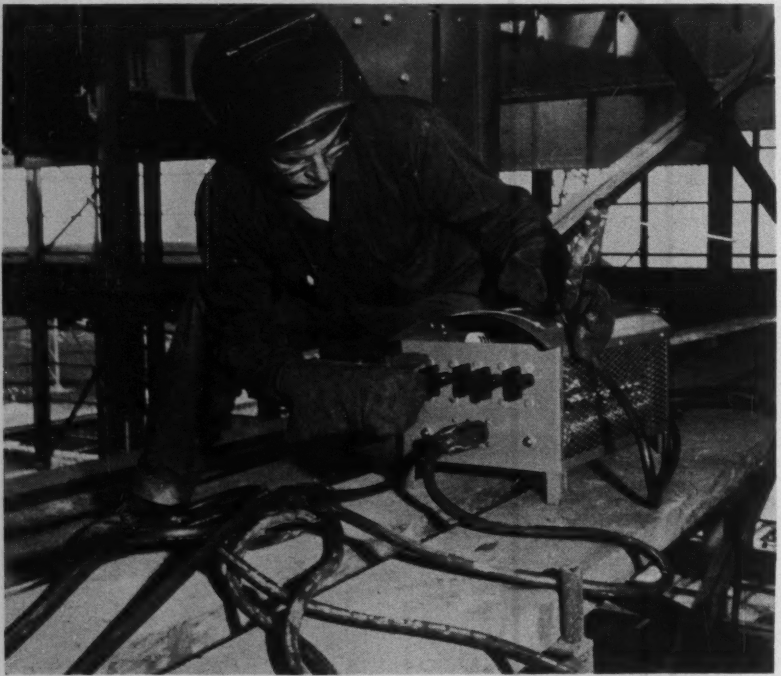
This system is earmarked for high production and economy.

▪ The flexibility and economy of manual arcwelding are two big reasons why the stick electrode continues to be a safe bet for the metalworker. Other welding methods are coming along at a fast pace but, with the manual electrode, you know what to expect.

Big fabricators are waging an all-out war against rising costs. How can these companies reduce their overall costs? Nearly a hundred of them have found an answer in the multi-arc welding system. Many companies in the shipbuilding, construction, automotive and general fabrication industries are getting worthwhile results from the system.

In constructing two power plants for the supply of electricity to New York City, for example, Consolidated Edison is using 10 power sources to furnish a total of 400 arcs. Each of the ten silicon-rectifier welders operates in conjunction with series resistance grids to come up with the welding outlets needed.

Busy Network—At Con Edison's Astoria, N. Y. plant, six 1500-amp power sources, made by A. O. Smith Corp., Milwaukee, supply 240 arcs. This 9000-amp power pack is fed from a 208-v, 60-cycle, 3-phase ac input through 600-amp safety switches. A dc output connects to the building's five risers, which have taps at several elevations.



HANDY ADJUSTMENT: Individual operators can make time-saving adjustments for welding current without leaving their work areas.

There's no problem connecting individual arcs through resistor banks to the nearest riser tap. Each one of the 40 banks contains six drawers. In turn, each drawer provides welding current for one operator. That adds up to a total of 240 welding arcs. At peak load, the average use factor for all the six-man units is about 90 pct.

To set his current, the operator merely combines switches on a drawer front. He does not have to go to the power source.

Variety of Methods—Arcwelding isn't the only process the setup can handle. Tack welding, stud welding, arc air gouging and inert-arc welding can also be used. The exact number of arcs furnished by a particular rating depends on the duty cycle required. It also depends on the normal diversity of welding operations.

During World War II, shipyards did make use of a similar welding concept. Although series resistors were hooked in with power sources, it differed from the present-day system in one respect. The power sources were constant-potential motor-generator sets. These sets were cumbersome and required a great deal of maintenance.

As a result, the Navy has begun the changeover to more modern rectifier units. The Navy has added 39 of them in recent years.

Better Quality—The idea of having a portable grid resistor right nearby results in better overall welding. Since the current control is right at the operator's side, the exact current is used. The stable arcs produced by the silicon rectifier machines produce welds that are both free of porosity and inclusions.

Production rates benefit, too.

Welders don't spend so much time making adjustments. They now have more time to deposit weld metal.

Suppose all the welders operating from a single power source are striking arcs at one time. Won't this exceed the unit's continuous power rating? The power units are designed to take this factor into consideration.

Designed for Safety — They'll handle 150 pct overload for two minutes. They'll also withstand a 200 pct overload for about one minute without shutting down. This factor isn't quite so serious as it sounds. The reason is that a manual electrode burns off in about 90 seconds. As a result, such a condition usually corrects itself automatically.

Even if every welder did strike an arc at one time, protective equipment would remove the power unit from the line instantly. The equipment is always protected against overload or other damaging electrical conditions.

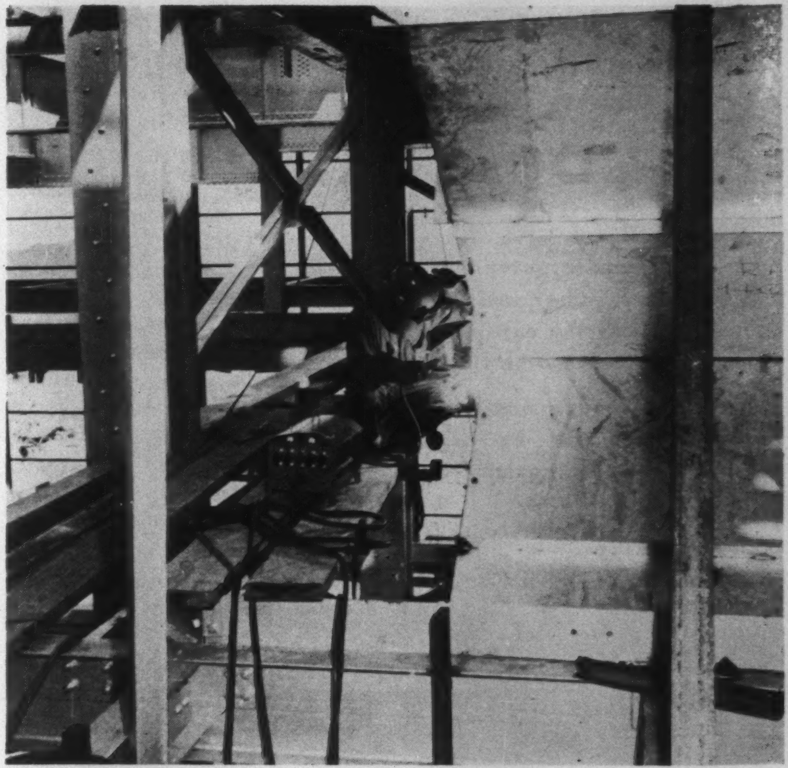
Look at it from a conventional viewpoint. Suppose you lined up 20 operators, each one working from his own 300-amp machine. A total of 6000 connected amperes would be required for this operation. On the other hand, the same work could be done using a single 1500-amp power source and the needed number of grid resistors.

Can You Afford It?—It doesn't pay to investigate the multi-arc system unless your work calls for 10 or 12 arcs. You can handle this number from one 750-amp silicon-rectifier welder.

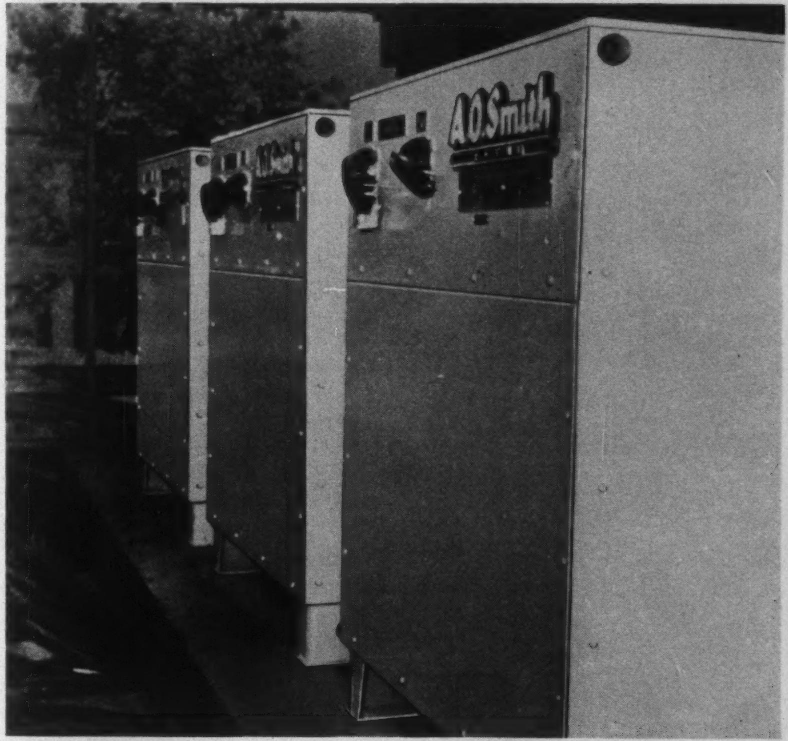
You also want to make sure that your concentration of arcs is centered in one general area. This does not mean that a welding station can't be several hundred feet away from the power source. It can be.

The power source should be placed in a convenient location. Other equipment, such as cables and electrode holders, is at the welding station.

Other possible targets for multi-arc welding include storage tank erection and boiler and pipe shops.



HANDLES OVERLOAD: Power units rated at 1500 amp 100 pct duty cycle can carry as much as 2250 amp, due to short-time overload traits.



POWER STATIONS: Consolidated Edison used these 1500-amp machines along with six-man welder stations in building its power plant.

"Black Light" Pin Points Flaws In Tube-Conditioning Line

By automatic start-stop turning of 10-in. diam rounds, an operator checks the entire surface for seams and other flaws.

Without excessive waste, defects are removed by flame scarfing in the conditioning area.

▪ Recently completed for Algoma Steel Corp., Ltd., was a $1.5 million tube-round conditioning installation.

Main feature of this ultramodern Sault Ste. Marie, Ont., installation is straight-line flow. A central conveyor system incorporates a series of drive rolls. Controlled in segments, it feeds all stations from storage to shipping.

In between are tube-round straightening, peeling, testing, holding tables, and lift-off devices. Transfer tables permit by-pass of key stations to provide complete flexibility of operations.

INTO STRAIGHTENER: Central roller conveyor moves tube rounds through straightener. Next, rounds move through peelers to test site.

Big Rounds—Two-thirds of Algoma's tube-round production goes into oil-well casings. The rounds range upwards to 10-in. diam and 40½ ft in length. Weight: a maximum of five tons.

Most of the rounds are peeled up to 1/16 in. After peeling, any surface defects detected by Magnaglo tests are eliminated by flame scarfing in the conditioning area.

Magnaglo, developed by Magnaflux Corp., Chicago, was first used for billet testing by Timken Roller Bearing Co., Canton, O. Seven years ago, Timken adapted handling equipment and a standard Magnaglo power unit to handle its tube rounds.

This installation became the pilot operation. It supplied much of the engineering, metallurgical, and operating data that resulted in Magnaflux's billet handling and testing systems for the basic steel industry.

Five Stages — Magnaglo testing features five major steps in automatic progression. These are: conveyor feed to billet-holding table; magnetizing; flooding with fluorescent Magnaglo; "black light" testing for discontinuities; and carry-out for either conditioning or customer shipment. A single operator, inside a darkened viewing booth, controls these movements from a central switchboard.

If individual, manual operation of one or a combination of stations is needed, there's a separate control for each cycle. Once cycling of the machine has been established during manual start-up, further handling of tube rounds through synchronous, progressive movement at all stations becomes automatic.

The Magnaglo equipment takes over as tube rounds arrive at the holding table from the conveyor.

Arms lift the rounds from the conveyor for gravity-roll feed onto the table.

Uses High Amperage—Upon signal from the operator, the billet moves into a clamping device. Then, a special power pack magnetizes it with high-amperage electricity. Magnetizing is circular for detection of longitudinal seams over the entire surface of the round.

During magnetization, rounds are flooded by the flow-on method. The inspection bath contains fluorescent magnetic particles suspended in conditioned water. This water is kept in a reservoir tank built into the basic frame. In installations subject to freezing, thermostatically-controlled heating elements are provided.

A series of arms lowers the tube rounds, one at a time, onto a viewing table beneath a battery of "black lights." By automatic stop-start turning of the rounds, an operator in a central control station examines the entire surface.

Seams and other surface flaws in magnetized rounds form local magnets to attract and hold the magnetized particles. Under the black light, these appear as fluorescent yellow lines that extend along the surface longitudinally.

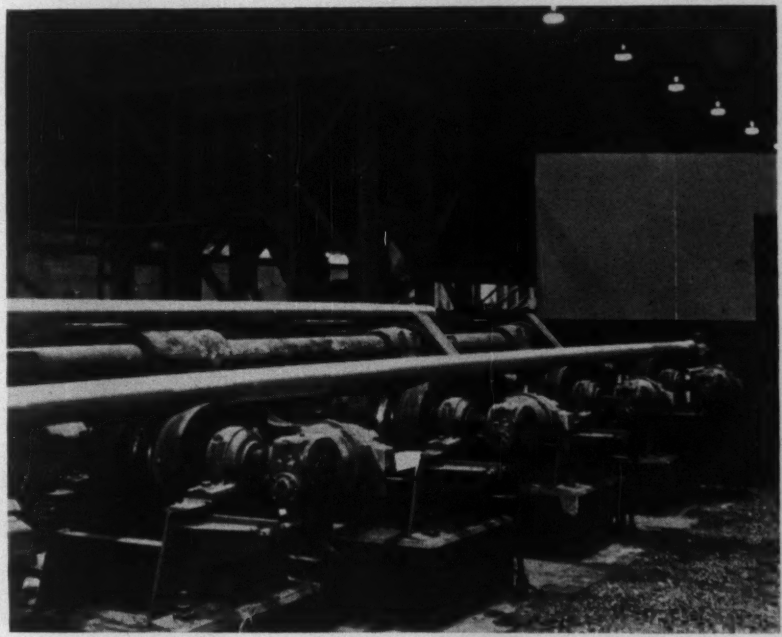
Repeat Cycle — These yellow-line indications are of varying length and depth, measured in hundredths or thousandths of an inch. Ability to measure depth, and to control test sensitivity are other features of Magnaglo testing.

The operator marks indications with chalk. Upon completion of testing, he actuates the carry-out conveyor. A round, emerging from the viewing booth, trips solenoids that automatically actuate all other stations to repeat the cycle.

Rounds that need conditioning move to conditioning areas. Flawless ones move directly to the shipping area.

A number of factors establishes the testing rate. The number of operators and the speed of integral, associated handling equipment are

FLAWS SHOW UP: Operator tests tube rounds for flaws that appear as yellow lines under the test light. Each flaw is then marked with chalk.



INSPECTION IS DONE: Inspected tubes emerge from the test chamber. If conditioning is required, the tubes are lifted onto a holding table.

CENTRAL CONTROL: One control actuates the movement of all rounds.

some. Another is sensitivity adjustment of the unit. It can be set to overlook minor, unimportant flaws.

Comparisons of labor and material costs of Magnaglo versus peeling aren't yet final. But Magnaflux Corp. states that with these comparisons the edge seems to favor Magnaglo testing. One factor for this conclusion is the elimination of numerous peeler-cutting tools.

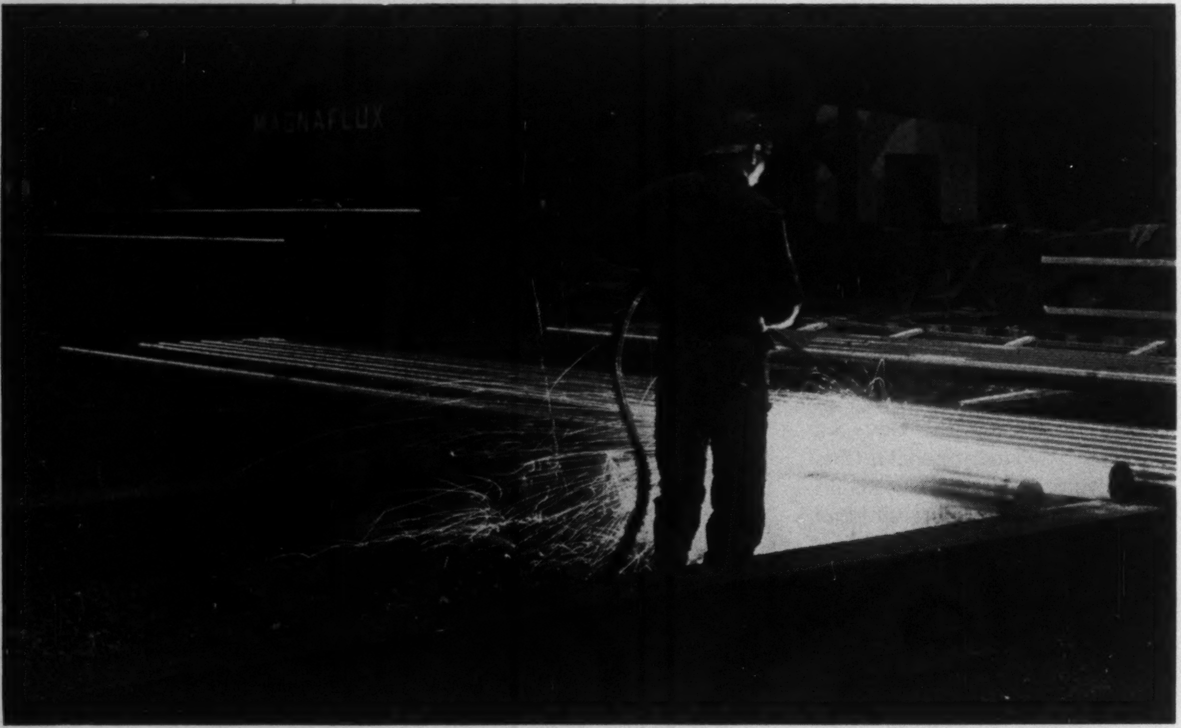
Savings Pile Up—Many other advantages can be cited for Magnaglo. Claimed to be one of the greatest savings is the elimination of "over inspection." As Magnaflux points out, in peeling, all rounds—even those without flaws—are shaved. The amount of bite is fixed on the basis of expected or anticipated depth of surface flaws.

With Magnaglo testing, tube rounds free of imperfections are quickly determined and diverted to the shipping area. Just as quickly, those requiring conditioning are marked and sent to flame-scarfing areas. No metal is lost or peeled away.

In some mills, where visual or chip inspection is used, it's possible to overlook some imperfections. These remain in the steel through all follow-up operations, into the finished product.

Other basic steel producers are showing interest in this method of billet testing. Several large companies are in various stages of their own evaluation programs.

The first Magnaglo "black light" testing system was installed by Algoma, specifically for semi-automatic handling and testing of large-size tube rounds. Two future installations are now being scheduled. They'll be at the Donora, Pa., Works of the American Steel & Wire Div., U. S. Steel Corp., and at the Copperweld Steel Co., Warren, O.



FLAWS REMOVED: Final conditioning area is adjacent to the test equipment. A hot-flame scarf removes each flaw. Previously, additional peeling was used to get rid of all defects. This caused a lot of waste.

At Amana Refrigeration, Inc.

STANOIL

IMPROVES PRODUCTION
REDUCES MAINTENANCE

Smooths operation of 600 ton hydraulic press

Situation: The 600 ton Verson Press at Amana is a vital operating component in the manufacture of home freezers and refrigerators. Its proper performance is necessary to the efficiency of Amana's entire manufacturing operation. That's why erratic press operation, caused by foaming of the hydraulic oil, was a serious problem.

What was done? In seeking the solution to this problem, Amana consulted their Standard Oil lubrication specialist who recommended STANOIL for this service. STANOIL Industrial Oil is a top quality, first-line industrial lubricating and hydraulic oil. It will provide excellent service in many different applications. And when tested by Amana, STANOIL proved perfect for use.

What has happened? Since STANOIL was first put to work at Amana, it has performed for extended periods of time without foaming or oxidation, lengthening the time between drainings and improving press operation. As a result of this record, STANOIL has been adopted for use on other production equipment, together with Standard's RYKON Greases and SUPERLA Soluble Oil.

What you can do: To get help in solving your lubrication problems and to learn more about STANOIL Industrial Oils, simply call the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Ill.**

You expect more from and you get it!

STANDARD

Standard's Jess Nelson (center) and Gene Maske (left) checking lubrication survey with Leonard Rettig, Amana's plant maintenance superintendent. Jess, who is District Engineer for Standard, is a specialist in this kind of operation. He has an engineering degree from the University of Iowa, and has also graduated from the Standard Oil Sales Engineering School.

OUTSIDE...

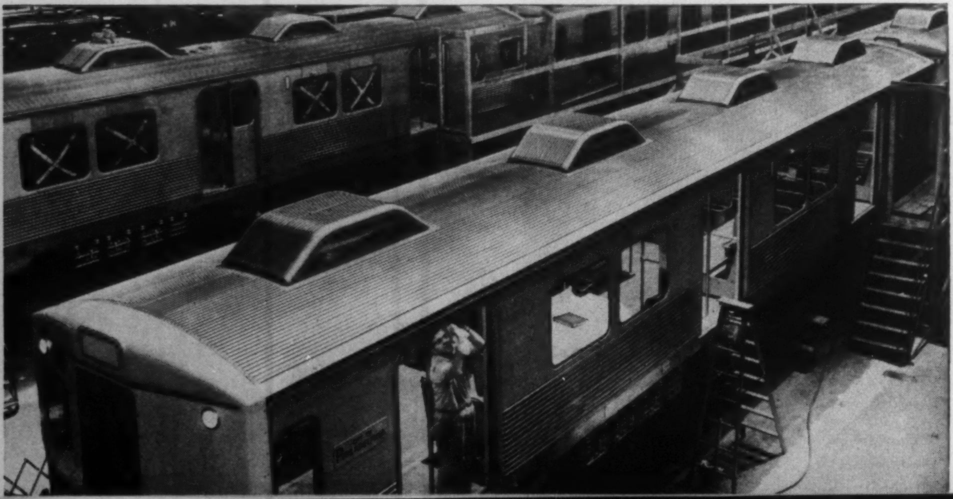
It's literally true that Stainless Steel trailers do not wear out before they become obsolete. Some of them have logged over a million miles. Once, a load of lampblack in a Stainless trailer caught fire and burned for five hours. Wheels, bearings, brake linings, drums (and cargo) were completely destroyed. They were replaced and the trailer body is still in service.

Water, harsh marine or industrial atmospheres can corrode and rot trailer bodies of other materials. Not Stainless. And Stainless Steel is strong—it has a yield point almost four times greater than competitive materials, so Fruehauf engineers (who designed this trailer) can design thinner, lighter walls, roof and braces. Strength goes up, and so do payloads and profits. Maintenance costs go down. The trailer shown here is 40 feet long, is built of type 302 Stainless, and is the strongest, lightest trailer in its class.

INSIDE...

In Philadelphia, 270 sleek new Stainless Steel subway-elevated cars are in process of going into service, with more than 100 already running. Manufactured by The Budd Company of types 201 and 202 Stainless, they were designed to win new riders to mass transportation, yet they will be cheaper to operate and maintain than any similar rapid transit cars ever built.

These cars will be exposed to all kinds of atmospheres—from the dampness of the underground tunnels to the sleet, rain, snow or hot sun above ground. But they'll always look new and shiny—because they're Stainless Steel. A quick hosing-down will keep them looking that way, and costly painting will be eliminated because Stainless Steel keeps its good looks. And the Philadelphia Transportation Company will save in other ways too: since these new cars weigh only 49,000 lbs., it won't take as much power to run them. Savings in maintenance and operation will add up to some $6,500,000 over the 30-year depreciated lifespan of the fleet.



. . . and in between

Only Stainless Steel offers designers and fabricators this unique combination of properties: great strength, extraordinary corrosion resistance to an enormous variety of reagents, outstanding high temperature properties, and good appearance. It is easily fabricated, and it actually costs less in the long run because it lasts longer. For unmatched efficiency, durability, ultimate economy, specify Stainless Steel. For a wide selection of Stainless Steels and for prompt delivery ask your USS representative or nearest steel service center.

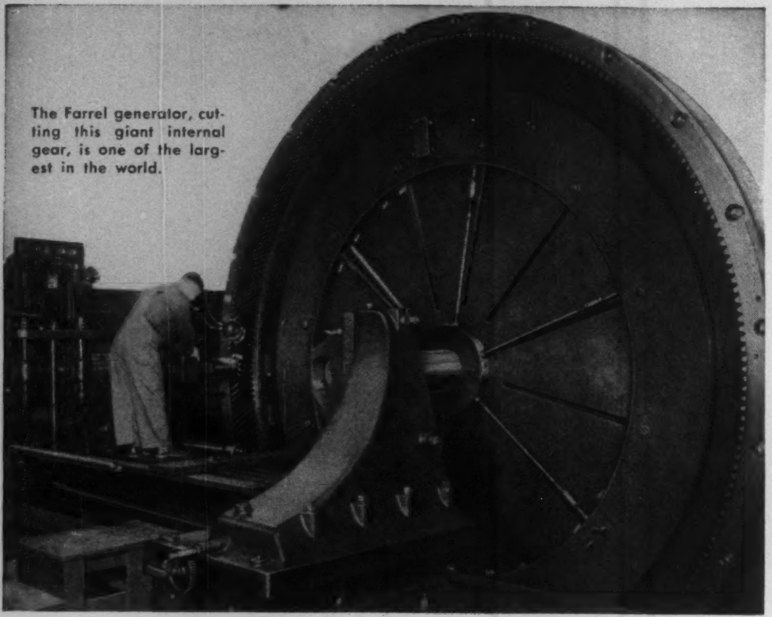
USS is a registered trademark

This mark tells you a product
is made of modern, dependable Steel.

United States Steel Corporation—Pittsburgh
American Steel & Wire—Cleveland
National Tube—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

USS Stainless Steels . . . no other metal makes such a material difference in so many applications



The Farrel generator, cutting this giant internal gear, is one of the largest in the world.

GIANT GEARS
for giant jobs

When designs call for huge gears, specify Farrel. The company has the experience and the gear-cutting and machining facilities to produce the largest gears required.

Farrel single-helical or spur gears are produced with generated teeth in sizes up to 23 feet diameter, 30 inches face. By alternate cutting methods this diameter limit can be greatly exceeded.

Continuous-tooth herringbone gears are made in sizes up to 23 feet diameter, 60 inches face; internal gears, with single-helical or spur teeth, up to 23 feet external-blank diameter, 20 inches face.

Call Farrel on your next large gear requirement. Farrel engineers will analyze your problem and recommend gears suitable to your requirements.

FARREL-BIRMINGHAM COMPANY, INC.
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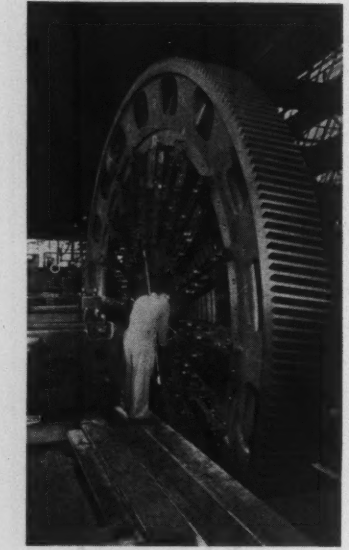
FARREL®



This huge, 7-degree, single-helical gear will be used in a cement kiln.

AGMA

FB-1198

PATENT REVIEW

New Patents In Metalworking

For Die Forging

Ferrous alloys and articles made therefrom, D. P. Hughes and S. G. Fletcher (assigned to Latrobe Steel Co., Latrobe, Pa.), Aug. 16, 1960. A deep hardening and non-deforming alloy can be used in die forging of superalloys, extruding of aluminum or brass, and like metal-working operations. The alloy consists of 0.65-3 pct C, 3-10 pct V, up to 2 pct each of Mn, W and Si; 3-8 pct Cr, 0.5-3 pct Mo, up to 3 pct Ni, up to 0.25 pct S, and the balance substantially all Fe. No. 2,949,356.

Conducts Current

Contact element for electrolytic processing of wire and the like, F. P. Roy and R. L. Sallo (assigned to U. S. Steel Corp., Pittsburgh), July 26, 1960. Novel contact element for conducting current to steel wire or strip undergoing electrolytic processing. Such processes include: electroplating, electrolytic cleaning, electropolishing, anodizing, and the like. No. 2,946,734.

Nickel-Free Alloy

High-temperature alloy, W. W. Dyrkacz, E. E. Reynolds, R. R. MacFarlane and R. K. Pitler (assigned to Allegheny Ludlum Steel Corp., Brackenridge, Pa.), Aug. 16, 1960. An austenitic nickel-free alloy is capable of use at high stress levels, at temperatures up to about 1350°F. The alloy comprises 0.3-0.35 pct C, 0.2-0.75 pct Si, 16-20 pct Mn, 11.5-13.5 pct Cr, 2-4 pct Mo, 0.6-0.95 pct V, 0.1-0.25 pct N, and the balance Fe with incidental impurities. No. 2,949,355.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

Improved Copper Coating for Wire Increases Coating Adherence, Color Uniformity

AMCHEM CUPRODINE* NO. 5 IS A LOW COST, NON-ELECTROLYTIC COATING FOR LUBRICATING CARBON AND STAINLESS STEEL WIRE, TIRE BEAD WIRE, COLOR CODING AND DECORATING PARTS

The latest Cuprodine from Amchem provides carbon and stainless steel wire and stampings with a particularly effective and adherent copper coating which appreciably reduces scratching of the wire and pickup and wear on dies during forming.

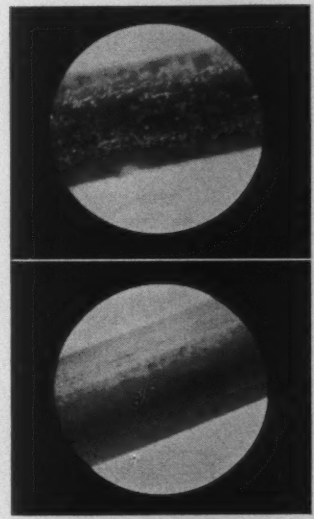
In treating tire bead wire, the uniformity of Cuprodine No. 5 coatings retained during drawing provide an excellent bonding surface for the rubber. Industry has found wide usage for Cuprodines in color coding parts while the durable and attractive copper coating provides an excellent decorative and protective finish on end products.

Investigate Cuprodine No. 5 for your own particular requirement—it's fast, economical, efficient—requires only simple immersion compared to costly racking and auxiliary equipment needed in electroplating processes.

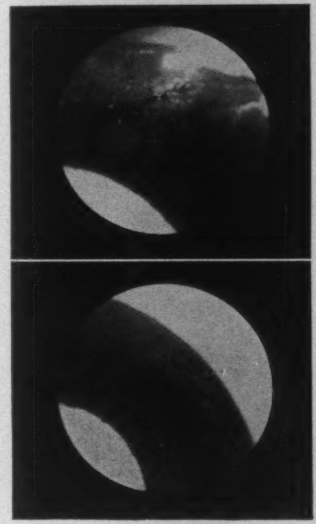
Another development from Amchem's Metal Protection Laboratories, the pioneer in specialized coatings for 46 years—from the first copper coating without the use of electroplating current, to today's standard in copper coating processes—Cuprodine No. 5.

AMCHEM **CUPRODINE**

Cuprodine is a registered trademark of
AMCHEM PRODUCTS, INC. (Formerly American Chemical Paint Co.), **AMBLER, PA.** • Detroit, Mich.
St. Joseph, Mo. • Niles, Calif. • Windsor, Ont.



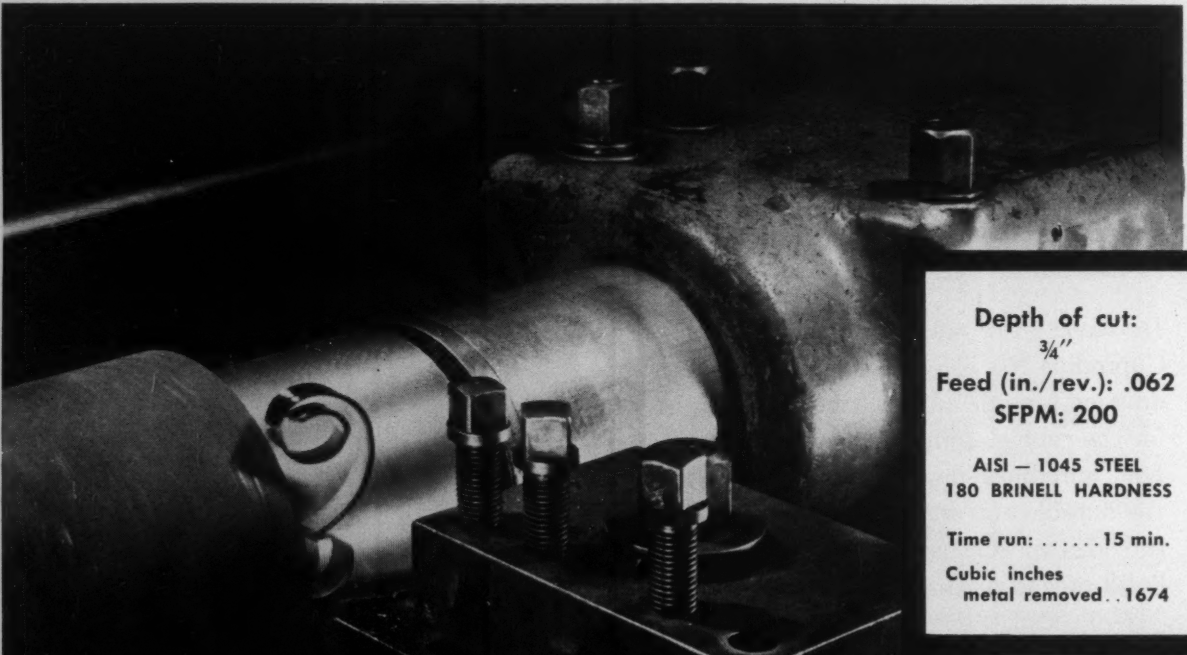
At top, photomicrograph (50x mag.) of copper sulfated wire after removal of the coating in ammonium persulfate solution. Note heavy corrosive attack and pitting on copper sulfate-treated wire. At bottom, Cuprodine-treated wire subjected to same test.



At top, photomicrograph (50x mag.) shows copper sulfated wire after simple manual bend test. At bottom, photomicrograph shows bend tested Cuprodine-treated wire exhibiting only a slight attack to coating while copper sulfate-treated wire shows heavy flaking of coating.

*Amchem's registered trademark for its copper coating chemical.

Why?



Depth of cut:
¾″
Feed (in./rev.): .062
SFPM: 200

AISI — 1045 STEEL
180 BRINELL HARDNESS

Time run: . . . . . . 15 min.

Cubic inches
metal removed . . 1674

Depth of cut:
¼″
Feed (in./rev.): .020
SFPM: 400

AISI — 1045 STEEL
180 BRINELL HARDNESS

Time run: . . . . . . 37 min.

Cubic inches
metal removed . . . 888

Why is one Carboloy® carbide grade best for light-duty steel-cutting applications; another more suitable for heavy-duty jobs? And which should you use?

Carbide selection can be scientific (and *should* be!) if you are going to get optimum results from your steel-cutting operation.

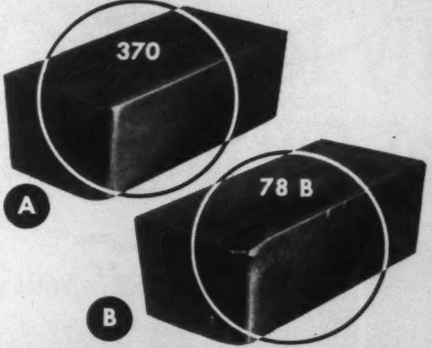
Take the job-graded Carboloy Grades 78B* and 370, for example. The 78B Grade is designed to offer real economy in normal steel-cutting applications—where machine power is limited. The 370 Grade, on the other hand, was developed specifically for heavy-duty steel-cutting jobs. Look over the following examples; then contact your Carboloy representative, or Authorized Carboloy Distributor, for information on Carboloy *job-graded* carbides for your specific operation. Take advantage of *better profits through better tooling.* Call today, or write: *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Road, Detroit 32, Michigan.*

*Carbides in 78 Series are all pre-honed. Carbides in the 300 series are available pre-honed, precision-ground, or utility-ground.

HEAVY-DUTY MACHINING

Photograph A shows the Carboloy 370 Grade insert after the run. Wear land was only .012″, and there is no deformation (upsetting) of the cutting edge. Photo B shows the 78B Grade insert after the same run. Note the deformation of the cutting edge . . . Grade 78B was not designed for such severe cutting pressures.

CONCLUSION: *In this heavy-duty application, Carboloy 370 Grade is recommended.*

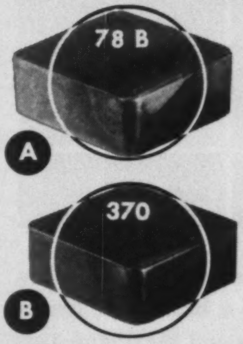


This is the chip removed by the 370 Grade insert with a ¾″ depth of cut.

LIGHT-DUTY MACHINING

In this light-roughing application there is little visible difference between the Carboloy 78B Grade insert (Photo A) and the 370 Grade insert (Photo B). Because 78B Grade is job-graded for light- and medium-roughing applications, it will wear as long as 370 Grade. Grade 78B insert is lower in initial cost, so in this case it makes good sense to use Grade 78B. In this example, the wear land on 78B insert was only .010″.

CONCLUSION: *In this normal steel-cutting application, Carboloy 78B Grade is recommended.*



This shows the chip removed by the 78B Grade insert with a ¼″ depth of cut.

CARBOLOY®
CEMENTED CARBIDES

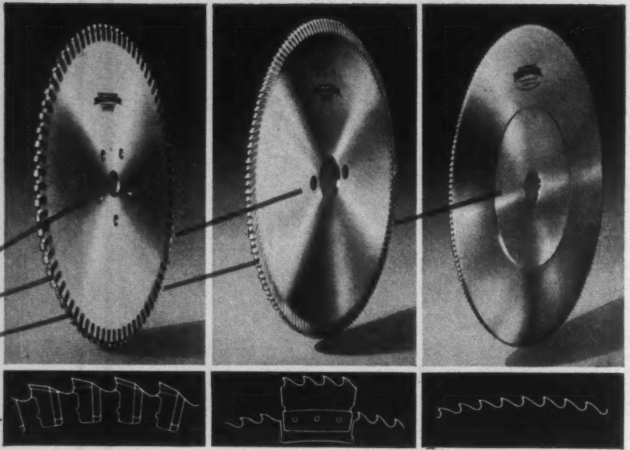
METALLURGICAL PRODUCTS DEPARTMENT
GENERAL ELECTRIC

CARBOLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRITE® • VACUUM-MELTED ALLOYS

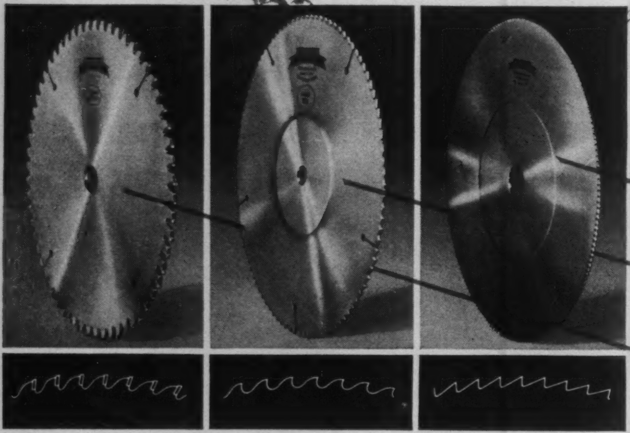
Do you cut ferrous metals? If so, Simonds has three basic saw designs for you:

INSERTED TOOTH METAL SAWS
SEGMENTAL SAWS
SOLID TYPE SAWS

Available in High Speed
and Semi-High Speed Steels



There's a SIMONDS Circular Saw Exactly Right for Your Metal Cutting Job



If you're cutting non-ferrous metals, Simonds offers you:

SOLID STEEL SAWS
Available in "Si-Maloy", in High-Speed Steel for cutting where extreme abrasiveness is present, and in Semi-High Speed Steel.

HIGH SPEED STEEL, HARD RIM SAWS
Hard cutting edge, soft center gives you long life coupled with safety.

CARBIDE TIPPED SAWS
for cutting aluminum and magnesium, as well as other non-ferrous metals

No matter what kind of metal you're working, there's a quality Simonds blade just right — a blade that means faster, cleaner cuts, longer blade life and maximum performance.

Find out how a Simonds Circular Metal Cutting Saw can mean important savings for you.

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New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Cold-Headed Fasteners

Illustrations by product groups of parts and fasteners are contained in a four-page bulletin. Cold heading design information and sales representative directory are also included. (John Hassal, Inc.)

For free copy circle No. 1 on postcard

Cleans Metal Parts

Literature concerned with a metal-parts chemical cleaner shows a photograph of the unit. It also shows an exploded view with all basic parts noted. The cleaner is designed to clean unusual and complex shapes. (Pall Corp.)

For free copy circle No. 2 on postcard

Automatic Lathes

Including individual brochures, a jacketed packet of literature deals with automatic lathes. All of the machines have the same basic bridge design. (Jones & Lamson Machine Co.)

For free copy circle No. 3 on postcard

Tangent Benders

Air-operated tangent bending machines are described in a 12-page brochure. Special information correlates bending radius with flange height. Special bender designs are illustrated with combination equipments for full automatic fabrication lines. (The Taylor-Winfield Corp.)

For free copy circle No. 4 on postcard

Autographic Plotters

Multi-record autographic plotters are presented in a bulletin. The bulletin supplies application use and complete specifications. Savings in test time and fast evaluation of tests obtained with "visual data plotting" of the company plotters are also explained. (Gilmore Industries, Inc.)

For free copy circle No. 5 on postcard

Bench Welders

A bulletin covers a line of bench-type spot welders. It illustrates and describes the line of bench welders in capacities from 5-50 kva. (The Federal Machine & Welder Co.)

For free copy circle No. 6 on postcard

Fork Trucks

Container-handling fork trucks are described in a six-page brochure. Five heavy-duty fork-lift trucks handle van-sized shipping containers. The trucks range in capacity from 14,500-45,000 lb at 48-in. load centers. (Clark Equipment Co.)

For free copy circle No. 7 on postcard

Furnace Equipment

Pre-engineered industrial furnace equipment for heat processing is covered in a bulletin. It includes a special selection guide which enables readers to select the proper equipment in relation to their particular heat-processing requirements. (Sunbeam Equipment Corp.)

For free copy circle No. 8 on postcard

Cast-Tooth Sprockets

Stock sizes of cast-tooth sprockets are conveniently listed in a 12-page book. Cast-tooth sprocket teeth are ground to fit the chain. Selection data in the book are based on this "sprocket-to-chain" relationship. (Link-Belt Co.)

For free copy circle No. 9 on postcard

Fireclay Refractories

The principal brands of the manufacturer's fireclay refractories are reviewed in an eight-page brochure. The brochure features refractory brands for medium-duty service, high-duty service and super-duty

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service. It gives property descriptions and load-test results. Descriptions and photos of manufacturing operations are included. (Harbison-Walker Refractories Co.)
For free copy circle No. 10 on postcard

Nitriding Processes

Dealt with in a 14-page illustrated technical bulletin are nitriding processes. The bulletin covers the case hardening of metals with anhydrous ammonia atmospheres in various nitriding applications. Included is a brief history of nitriding; also, information on nitriding equipment and techniques. (Armour Industrial Chemical Co.)
For free copy circle No. 11 on postcard

Air Cylinders

A circular illustrates a complete line of non-rotating air cylinders with a large center hole for operating air collet chucks. Principles of construction and operation are explained. (Powergrip, Inc.)
For free copy circle No. 12 on postcard

Paint Finishing

Complete paint finishing systems and component units are described in a 12-page bulletin. The literature includes a pictorial story of the finishing line and technical data of the components, construction and conveyors. (J. O. Ross Engineering)
For free copy circle No. 13 on postcard

Plain Grinders

Semi-automatic plain cylindrical grinders are reported in a six-page bulletin. The bulletin discusses features and gives condensed specifications. (Landis Tool Co.)
For free copy circle No. 14 on postcard

Balancing Machines

Outlining various balancing machines, a two-page catalog sheet gives specifications and pictures of the different models. Regarding their operation, full technical details are supplied. (For free copy, write on company letterhead to Micro-Balancing, Inc., Herricks Rd., Garden City Park, N. Y.)

Mining Machines

Mining methods with the company's crawler series is the subject of a 14-page booklet. Included is a short outline of the development of these crawler-mounted air- or electric-powered machines. The adaptability of the various units is shown by illustrations of various attachments that can be mounted. (The Eimco Corp.)
For free copy circle No. 15 on postcard

Rolls

For every engineer's personal file, a bulletin describes and illustrates the construction of rolls with stub shafts and through shafts. Also included are rolls with fabricated bodies and cast bodies, alloy rolls, stainless steel rolls and other types. (Barclay Machine, Inc.)
For free copy circle No. 16 on postcard

Plastic Lenses

Lightweight, optically-ground and polished solid plastic lenses are described in a four-page bulletin. The literature discusses advantages, applications, specifications and manufacturing facilities. (Fostoria Corp.)
For free copy circle No. 17 on postcard

Positioning Equipment

A 16-page guide to positioning equipment contains a reprint of an article which discusses the basic reasons for using positioning equipment. Described are the various kinds of equipment and the kind of work each is capable of performing. (Ransome Co.)
For free copy circle No. 18 on postcard

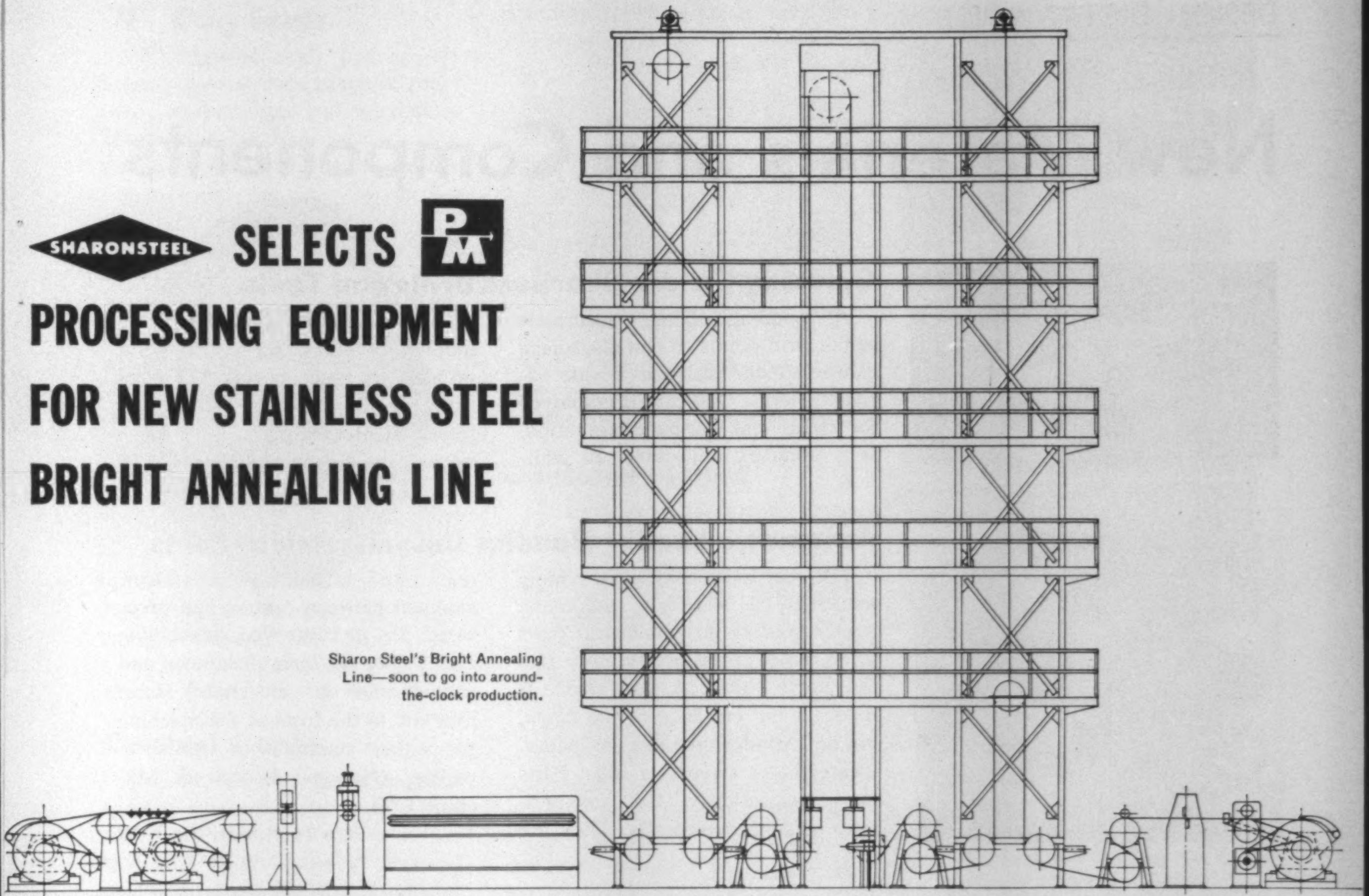
Heat Treating Stainless

Heat treatment and properties of cast hardenable stainless steels are covered in a 24-page technical research report. Discussed in detail are the heat-treating variables of hardenable stainless steels that have chemistries suitable for investment casting. (For free copy, write on company letterhead to WaiMet Alloys Co., 5320 Oakman Blvd., Dearborn, Mich.)

Temperature Control

A full description of an indicating differential, expansion-type temperature control is given in a bulletin. The model is for electric operation and includes a snap-action switch. The bulletin includes pictures, description of operation, and table of standard ranges, tube sizes and performance. (Burling Instrument Co.)
For free copy circle No. 19 on postcard

SHARONSTEEL SELECTS PM PROCESSING EQUIPMENT FOR NEW STAINLESS STEEL BRIGHT ANNEALING LINE



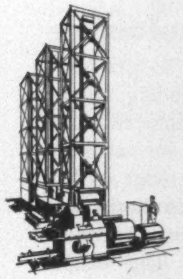
Sharon Steel's Bright Annealing Line—soon to go into around-the-clock production.

Today's most interesting development in the automotive trim market is the volume production of bright annealed stainless strip. Sharon's decision to adopt this process backs up their aim of providing a bright decorative strip that meets the most severe corrosion tests.

When Sharon Steel Corporation—one of the pioneers in stainless steel production—engineered their new, modern bright annealing line, they specified equipment designed and built by Production Machinery Corporation that will enable the line to give:

- stainless strip with a quality surface finish—protected by non-marking rolls
- continuous operation with minimum maintenance
- positive, sure strip tracking provided by 7 edge control points
- fastest coil handling and joining because of efficient, engineered equipment arrangement

Remember, P/M will design and produce what you require—the way you want it—when you need it. Let our engineers show you what "productioneered" processing lines and equipment can do to cut operating costs in your plant—build increased profits.



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Designers and Builders of Metal Processing Lines and Equipment including: lines for pickling, annealing, slitting, shearing, and cutting-to-length, grinding, scouring, coil build-up, inspection, and other sheet and strip processing lines and machinery.

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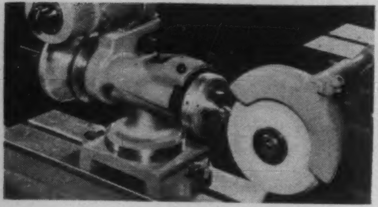
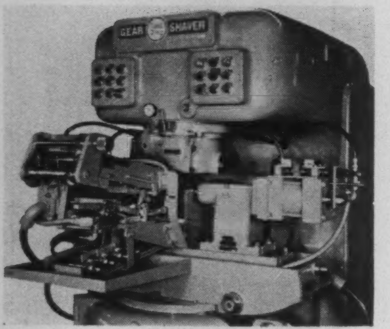


Grinding Fixture Sharpens Drills and Tools

A grinding fixture accurately grinds drill points. It can also shape cam-relief and sharpen a wide variety of tools. One cam is employed for right- and left-hand operation. It is infinitely adjustable. In addition, the cam is unlimited as to number of flutes. As a drill point grinder, its range covers 128 sizes from #80 through 1-1/32 in. (Harig-Steptool Co.)

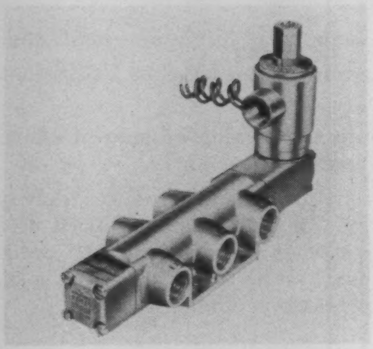
For more data circle No. 22 on postcard, p. 109



Automatic Loader Handles Unsymmetrical Parts

For gear tooth shaving or honing machines, a slide-type automatic loader permits unsymmetrical parts to be easily gaged before entry into the input chute. A size check is made at the entrance to the chute. An air cylinder operates the loader. The cylinder actuates a slide. Parts are automatically fed one-at-a-time at spaced intervals. They are fed into machining position, clamped between centers and processed in a controlled machining cycle. They are then unclamped and carried into an exit chute. Here, they roll to the front of the machine for either operator or conveyor pickup. (National Broach & Machine Co.)

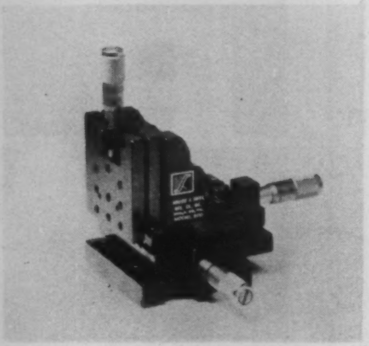
For more data circle No. 23 on postcard, p. 109



Valves Allow Operation in Hazardous Environment

Solenoid valves provide efficient operation of pneumatic and hydraulic fluid control systems, under hazardous environmental conditions. A forged bronze body completely encloses the valves. They come in explosion-proof, dust proof, waterproof and fungus-proof constructions. Maximum flow-passage capacity in slim-design sizes ranges from ⅛-in. NPT through ½-in. NPT, in two-, three-, four- and five-way types. This makes them ideal for close-quarter installations. They operate on pressures from partial vacuum to 500 psig. With no external moving parts, there is virtual trouble-free performance under all conditions. Valves are corrosion resistant. (Versa Products Co., Inc.)

For more data circle No. 24 on postcard, p. 109



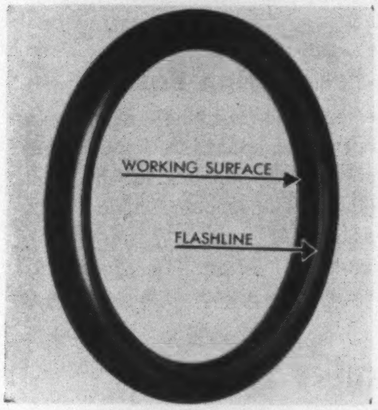
Device Positions Part or Tool During Manufacture

For parts requiring accurate positioning in manufacture, a device provides smooth, accurate and quick positioning in three planes—X, Y and Z. Three precise micrometer assemblies insure a steady measured movement up to ½ in. Both vertical and horizontal face plates contain holes for mounting tooling or other devices, or mounting onto other equipment. Material, hardness and finish are comparable to precision ball bearings. Easy-reading, glare-proof satin-finish micrometers have special crowned anvils for accuracy and low friction. The range of the device is: 0.500 in. in horizontal planes and vertical plane; 0.001 in. micrometers standard. The weight of the positioner is 5 lb, 10 oz. (Kulicke & Soffa Mfg. Co.)

For more data circle No. 25 on postcard, p. 109

"O" Ring Seals

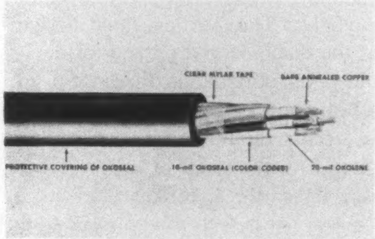
"O"-ring-type seals operate efficiently over a wide range of pressures, temperatures and tolerances. The flashline on the new seals is not placed on the centerline where the ring is subject to wear. The rings come in various sizes from 1/32- to 6½-in. ID. (Shurclose Seal Co.)



For more data circle No. 26 on postcard, p. 109

Control Cable

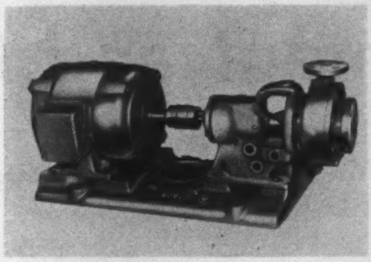
Suitable for all types of installations, a small-diameter plastic control cable has multi-wall construction. This offers three-fold electrical protection, since the basic conductor insulation, its protective covering and the overall jacket are all high-quality dielectrics. The double wall mechanically protects against the chemical attacks of oils, acids, alkalies. (The Okonite Co.)



For more data circle No. 27 on postcard, p. 109

Centrifugal Pumps

Single-stage, side section open impeller pumps have 1-in. flanged discharge, and 1 and 1½-in. flanged suction connections. Flanges are flat face 150 lb standard. The frame has wide openings that give ready access to gland and stuffing box. The pumps meet requirements in industries where small quantities of corrosive chemicals or slurries must be handled for heads up to 150 ft. Capacities are up to 115 gpm. (Goulds Pumps, Inc.)



For more data circle No. 28 on postcard, p. 109

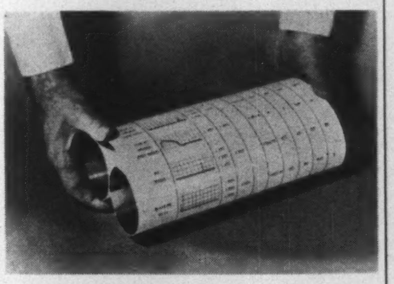
Container Latch

A light duty, adjustable container latch is designed for use on reusable shipping containers, transit cases and component assemblies. The latch has an adjustable draw-hook which stows flat within the handle when the latch is fully open. The adjustment is made by simply rotating the hook section. The range of adjustment is 0.30 in. in vernier increments of approximately 0.020 in. per turn. Special, overcenter toggle geometry, which is built into the latch, prevents it from springing open due to the movement of the container sections. (Camloc Fastener Corp.)

For more data circle No. 29 on postcard, p. 109

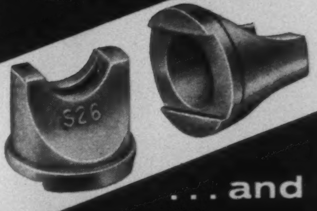
Self-Coiling Scrolls

Stainless steel scrolls efficiently store and legibly display printed information. Such information includes: scale readings, position indication or instructions. Being self-coiling, the scrolls eliminate the need for secondary drive equipment. The scrolls find wide use where the demand for built-in, visual display devices exists. (Hunter Spring Co.)



For more data circle No. 30 on postcard, p. 109

"the
HITCHINER
way..."



. . . and
non-machinable
super alloys
in
INVESTMENT CASTING

These spray nozzles for highway striping paint sprayers were formerly machined out of cold rolled bar stock. When ordinary paint was used, these nozzles functioned satisfactorily. However, when ground glass was added to the paint for reflecting purposes excessive wear caused frequent replacement.

By "the HITCHINER way . . .", we were able to engineer the manufacture of this part by investment casting in a non-machinable type alloy exhibiting a very high degree of resistance to both wear and corrosion.

This change of alloy, which eliminated the need for frequent nozzle replacement, was made possible through investment casting because the required close dimensional tolerances and detail could be cast to size.

Through the wide freedom of choice in alloy, as well as through flexibility in design and the elimination of expensive machining operations, investment casting may possibly solve your metal parts manufacturing problems. Send us your sample or blueprint and find out with a Hitchiner "engineered quotation" — no obligation.

NO LIMITATIONS. From miniature ball bearing races to 20" Steam Turbine Impellers, "the Hitchiner way . . ." with investment castings can help you.

Send for our latest revised brochure and find out for yourself. It's free.

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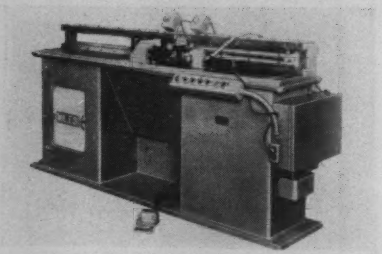
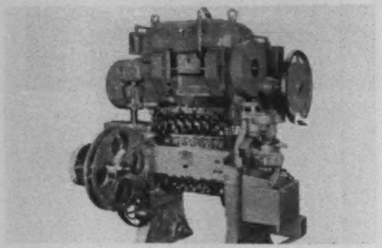
New Equipment and Machinery



Machine Broaches on High-Production Basis

Designed for external or internal broaching, a horizontal broaching machine has a long power stroke. This increases the range and types of work which can be handled. Interchangeable hydraulic ram power cylinders enable the user to further extend the machine's capacity or operating speed. A "package" power unit supplies the hydraulic power. The machine comes in capacities of 1, 2 or 3 tons, stroke lengths to 72 in. (Ty Miles, Inc.)

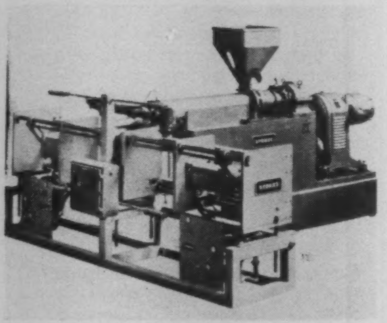
For more data circle No. 31 on postcard, p. 109



Presses Produce Parts at Close Tolerances

Producing stamped and drawn parts from roll stock, multiple transfer presses have long ram strokes. These permit: deep draws and a greater range of parts production. An electric clutch brake stops the machine in half revolution. This prevents severe tool damage. In most cases, each stroke delivers a finished product. As many as 14 or 15 operations can be performed as the part is transferred through the dies. (The Baird Machine Co.)

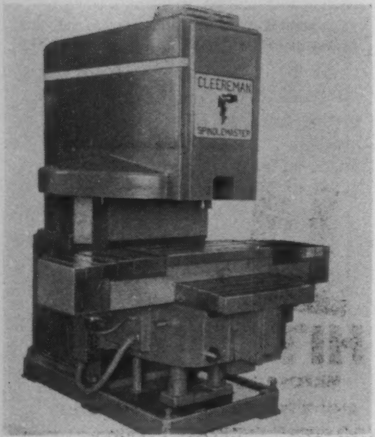
For more data circle No. 32 on postcard, p. 109



Blow Molder Molds Large Plastic Pieces

Ruggedly and solidly built from square-section tubular members, a blow-molding machine makes efficient use of the full output of a 3½-in. extruder. The unit provides five tons of clamping pressure at each of the two molding positions. Large platens at each molding position give 550 sq in. of mold area. The 13-in. maximum stroke of the clamping cylinder provides 28-in. of daylight. The vertical-flow design of the machine gives plenty of flexibility in utilization. Pieces up to 30-in. long can easily be handled. In this dual-manifold machine, there is a minimum of exposed service lines. (F. J. Stokes Corp.)

For more data circle No. 33 on postcard, p. 109



Machine Tool Controls Removal of Excess Stock

Used for the removal of excess stock from a piece part, a machine tool automatically makes tool changes in less than 8.5 seconds. It selects any of 30 tools from a magazine, while the table is positioning for the next operation. It does this all by numerical control. The unit will drill, tap, bore, ream or mill rapidly and concisely. Through tape commands, it will position all of three axes—single spindle and compound table. The machine tool will also control 18 spindle speeds from 150-3125 rpm. It will control 98 spindle speeds from 0.4-19.8 ipm, spindle and table traverse. Also through these commands, it activates coolant cycle and controls type of operation. For each operation mode, machine functions occur in a sequence consistent with the operation to be performed. To provide a variety of working heights, the table and carriage are mounted on an adjustable knee. (The Jackson-Fotsch Co.)

For more data circle No. 34 on postcard, p. 109

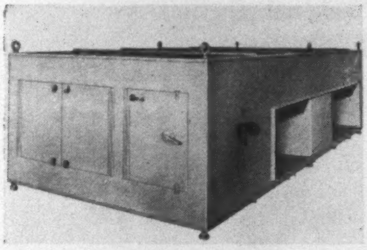
Thread Milling Machine

By sine bar adjustment, a machine mills left hand, right hand, external, internal, straight, tapered or special threads. This is done without changing any gears or cams. A simple dial setting of the sine bar gives the desired right- or left-hand lead. Any lead up to ½-in. can be set from the dial reading. The machine makes use of multiple thread cutters having no lead. However, it has the desired pitch and thread form. The machine feeds the cutter to depth. (Sundstrand Corp.)

For more data circle No. 35 on postcard, p. 109

Makeup Air Heater

Direct fired, a makeup air heater requires no ductwork. It operates independently of present heating system. This makes it simple and inexpensive to install. It is designed for all makeup air requirements, including tempering, drying and humidity control. The unit has full modulating air flow mixer and built-in electrical control panel. The heater comes in 26 standard sizes ranging from 8000-150,000 cu ft per minute. Full modulating turndown ratio is 25:1. (National Heater Co., Inc.)



For more data circle No. 36 on postcard, p. 109

Measuring

Usable wherever the "go-no go" philosophy is applicable, an adjustable gage has two pair of independently adjustable, oppositely opposed and spring-loaded gaging arms. One pair can be set for a given "go" dimension. One side of this pair has green identification dots. The second pair of gaging arms on the other side of the center rib (red dots) can be set for a given "no-go" dimension. This is ideal for checking both and/or either the

Killing blow! It takes only minutes for fire to burn your business to a crisp. Guard against the danger of a crippling flammable-liquid fire (as in the spray booth above) with a *fully automatic* Kidde carbon dioxide extinguishing system. Approved by U.L. and F.M., Kidde systems smother flammable-liquid and electrical fires in seconds, leave no mess, turn off power and sound alarms... get you back in production fast. Kidde's 35 years of experience can help you protect any hazard. Write Kidde today and find out how.

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CHAIN ASSEMBLIES
without delay with...

CM
Hammerlok®
COUPLING LINK

- NO PEENING
- NO WELDING

PLUS HERC-ALLOY CHAIN, OBLONG MASTER LINKS AND SLING HOOKS ALL AVAILABLE FROM YOUR CM CHAIN DISTRIBUTOR

COLUMBUS McKINNON
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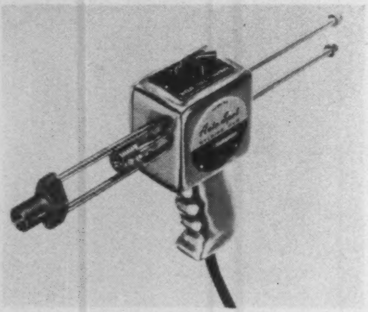
CM
CHAIN

inside diameters and the outside diameters where face grooves, ring grooves, "O" rings, and slots are machined or inspected. "Go" and "no-go" dimensions are maximum and minimum tolerances, respectively. (Speed Tool Co.)

For more data circle No. 37 on postcard, p. 109

Weld Gun

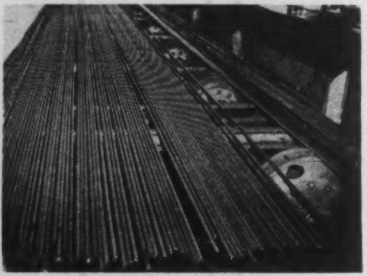
An automatic, arc spot weld gun welds from one side. By merely pressing against the work, the arc starts and the electrode is fed automatically. When the welding operation is completed, the gun shuts off. It is automatically reset and ready for the next weld. It welds all kinds of sheet metal from a minimum 26 gage to a maximum 12 gage. The gun weighs only 2 lb. It comes with its own power supply. (Bren Weld Corp.)



For more data circle No. 38 on postcard, p. 109

Arranges Rods

A device arranges bundles of entangled rods into a single layer. The apparatus finds use in the feeding plant of rolling mill furnaces and pipe testing machines. Bundles of rods, 10 tons or more, of square, round or other cross section, can be arranged in 3-5 minutes. Crooked rods, of circular cross section, can be automatically sorted out if desired. They can be made to lie on top of the layer. (Christiania Spigerverk)



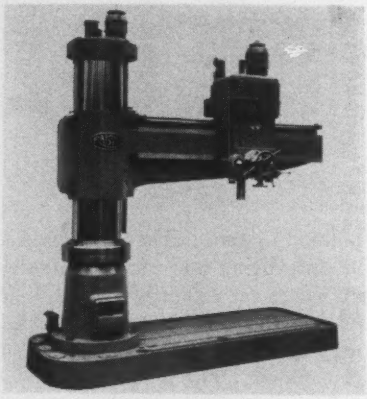
For more data circle No. 39 on postcard, p. 109

Shape-Cutting Machine

Intricate metal parts can be easily reproduced from simple pencil sketches on ordinary paper with an automated flame-cutting machine. The unit features a cross roll drive principle that takes the drive wheel off the tracing table. Drawings can be positioned without raising the tracing head. The machine can automatically reproduce metal parts from exact size drawings. Intricate parts are produced by simply feeding exact size pencil or ink drawings of the part into the machine. The unit can flame-cut intricate parts up to 10-ft wide, any length or thickness. (Linde Co.)

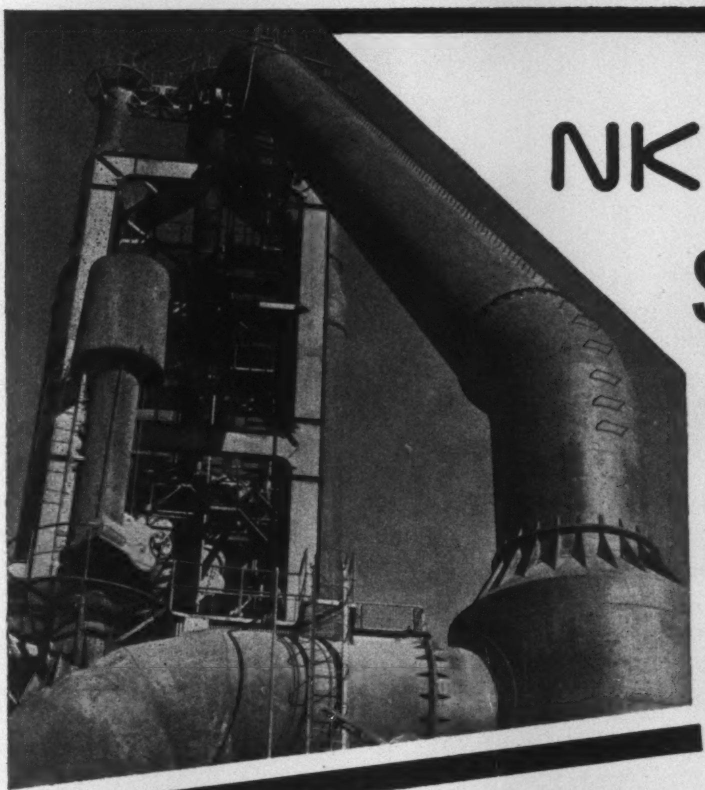
For more data circle No. 40 on postcard, p. 109

Radial Drill



With automated operation, a radial drill has automatic run off of all operating steps. The ultimate in accuracy is guaranteed independent from the skill of the operator. Errors due to faulty operation have been eliminated. The few control elements are conveniently arranged on the front plate of the drilling slide. The control mechanism is hydraulic. The operations necessary for vertical adjustment and clamping of the arm run automatically; likewise as those for clamping of the column and the slide. (Columbia International Corp.)

For more data circle No. 41 on postcard, p. 109



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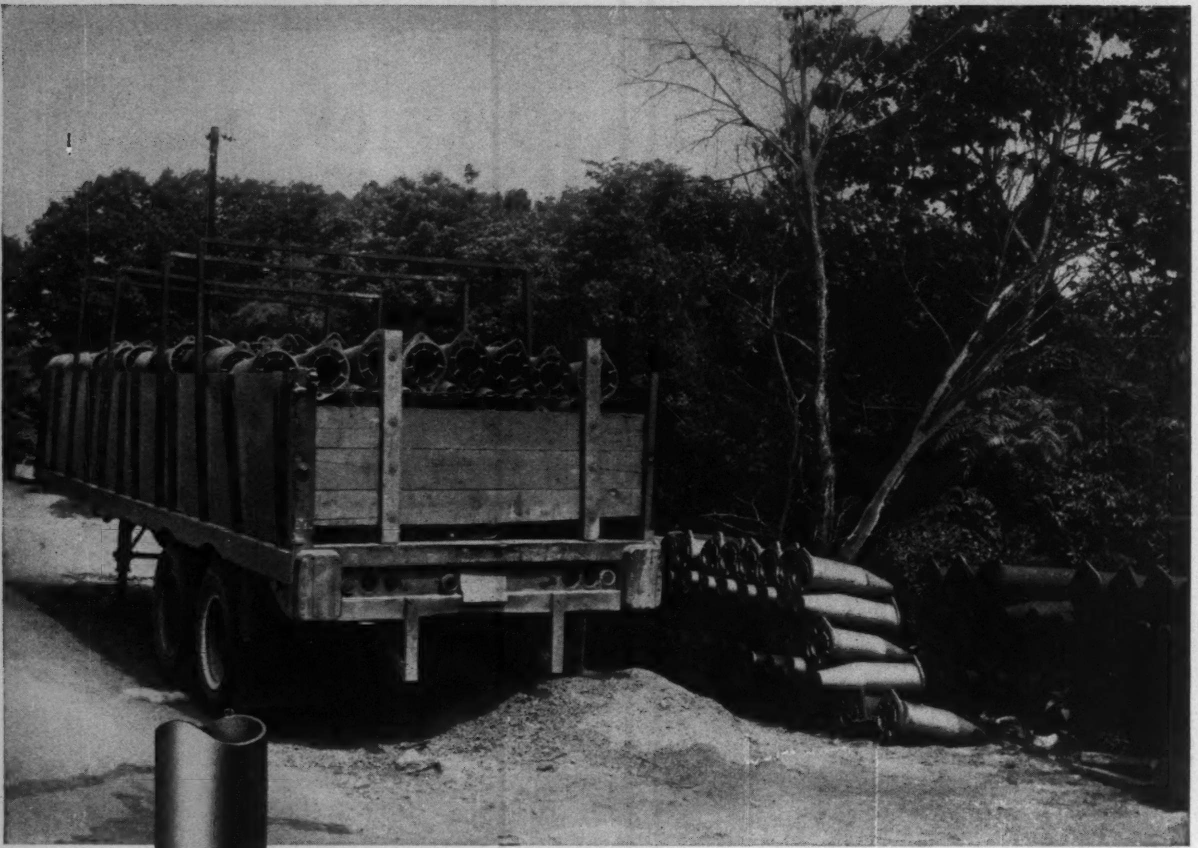

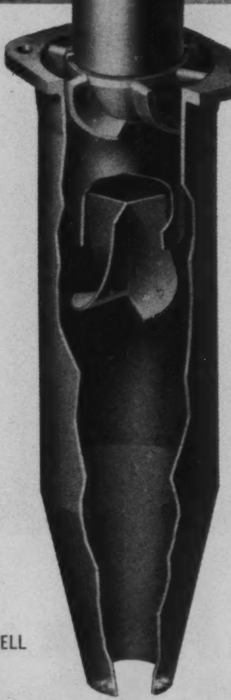

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The Iron Age Summary

Auto Cutbacks Hit the Market

Cutbacks and deferments by the major automakers will bite into the November and December shipments.

It probably means that December will be the low month of the year for the steel industry.

▪ Automotive steel orders will definitely drop in November and December. Unless general business picks up enough to offset the automotive decline, steel operations are likely to slide off for the next month.

Here is the situation as far as the major auto companies are concerned:

Order Pushbacks — Chrysler Corp.'s layoffs and production cutbacks on November 28 coincide with the fact that the company pushed one week of December steel into January. Some November tonnage had already moved into December, indicating the state of November-December orders.

Ford Motor Co. has also been pulling tonnage out of December and deferring it to January. It's believed that the company's January tonnage will reflect an "honest" car production schedule. In other words, the January order is based on what the company definitely intends to turn out in that month.

Upturn in January? — January production of cars at Ford looks better than December. This indicates Ford and probably others will use November-December as months in which they will cut down on inventory of new cars—still well over 900,000 units.

So far, General Motors has not been cutting back much on steel orders. This is because GM apparently has been more conservative and realistic in gaging its car output in the first place. There have been some steel order cutbacks at Fisher Body Div., however.

The automotive cutbacks are a factor in the general conclusion that December will probably be the low month for the year for steel. Overall market conditions are aggravated by the usual seasonal lull.

Scattered November Gains — In the overall market, there are only a few scattered favorable signs. In November, there was some improvement observed in shipments of bars, sheets and structurals. These are scattered by geography and market and cannot be called a trend in any case.

Meanwhile, mills are still plagued by rush orders and demands for quick delivery. (See Delivery Promises, p. 122). Reports from market areas show that a large bulk of tonnage shipped this month will have been ordered in November.

Late Ordering—Bar mills say 20 pct of the steel they ship this month will have been ordered after Nov. 1. For plates, structurals, and tubular products, late orders account for one-third of the monthly business. A stainless producer says one-half of all orders come in after the start of the month.

This accounts for much of the uncertainty in the market—and also for some of the false starts. Mills today do not know what the December order pattern will be and won't until well into the month.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	1,274†	1,464	1,545	2,540
Ingot Index				
(1947-1949=100)	85.9†	91.1	96.2	158.1
Operating Rates				
North East Coast	56.0†	57.0	57.0	99.0
Buffalo	51.0†	54.0	60.0	100.0
Pittsburgh	43.0†	48.0	48.0	93.0
Youngstown	28.0†	36.0	43.0	87.0
Cleveland	54.0†	54.0	57.0	88.0
Detroit	64.0†	70.0	73.0	94.0
Chicago	51.0†	52.0	56.0	86.0
Cincinnati	56.0†	54.0	61.0	87.0
St. Louis	65.0†	68.0	78.0	108.0
South	49.0†	52.0	51.0	85.0
West	44.0†	48.0	49.0	78.0
U. S. Rate	48.5†	51.4	54.2	89.7

*Revised †IRON AGE Estimate

Source: American Iron and Steel Institute

Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.32	$66.32	$66.41	$66.41
Scrap No. 1 hvy (Gross ton)	$28.33	$28.33	$29.50	$44.17
No. 2 bundles	$18.50	$18.50	$20.17	$30.50
Nonferrous				
Aluminum ingot	26.00	26.00	26.00	26.80
Copper, electrolytic	30.00	30.00	33.00	30-33
Lead, St. Louis	11.80	11.80	11.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	103.25	103.625	103.125	100.75
Zinc, E. St. Louis	13.00	13.00	13.00	12.50

Bearings Market Hits Low Point

Bearings makers expect 1960 to end up with fewer sales than 1959. Competition is tough.

Foreign imports are offering no problem, but now the U. S. producer who can deliver fastest is getting the orders.

▪ The bearings market is bouncing around on what many of its executives hope is the bottom.

While there will be several exceptions, the industry taken as a whole will wind up this year having done less business than last year.

The Signpost—One factor convincing many top bearings people that the current lull in orders is the low point is the appearance in the last month or so of the profits squeeze, something that has been plaguing many other metalworking industries for much of the year.

"For most of the year competition has been sharp but prices have been firm," says a spokesman for one bearings maker. "But about now many of our blanket orders from large buyers have been running out. When we approach them about next year we find that companies that haven't been competing for this business are already in there talking. And our old prices just aren't good enough."

Fastest First—And, the industry agrees that currently, as in the steel industry, the company that can deliver in a hurry gets the order. Service has been improved by most companies. But most bearings makers also say that they are not shading shipping costs.

THE END?: Bearings makers are hoping they've reached the low point in sales. For the most part the industry will wind up 1960 with fewer sales than in 1959. Competition is sharp and price shading is apparent.

Many executives insist this is not likely to be compromised. But others wouldn't comment, leaving the impression that this could be the next area for shading if things get much worse.

Minor Factor—In direct contrast to many other metalworking areas, foreign competition doesn't seem to be a major factor in this market. "Japanese and Austrian bearings are underpricing us by as much as 20 pct," says one company. "But they are making headway only with the marginal buyers. And even most of these are not going 100 pct to cheaper foreign bearings. They are being very careful to keep their U. S. supply lines."

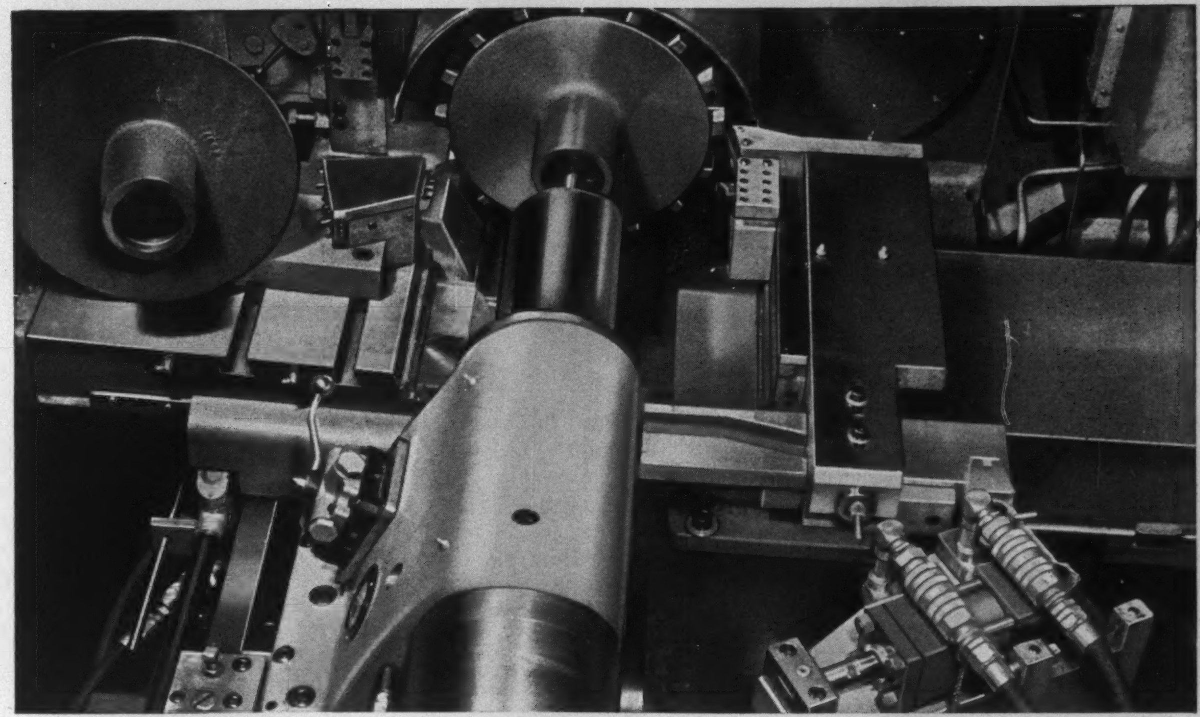
What is holding foreign bearings back? The need for extensive engineering by the bearings maker and reliable service, say U. S. bearings makers. The foreign bearings people just can't match U. S. service, they insist.

However, some foreign bearings have found the compromise that is likely to open up more U. S. markets. A bearings maker who agrees that foreign products aren't too much of a problem admits he is marketing a line of German-made bearings in this country.

These bearings, which supplement his line, are sold with the same engineering and service guarantees as the bearings this company makes itself.

Close Watch—Bearings makers also agree that when steel prices rise, they will also have to raise their prices. They expect this to bring the current price shading to an abrupt halt.

And during the current soft order market, many of the bearings makers are building up their finished goods stocks.



Note how 16-jaw chuck grips 10″-diameter, inner pulley disc on narrow portion of O.D. This permits machining entire flange face. Accurate taper is generated by cam-operated sliding toolholder shown at right.

No. 12 replaces two manual lathes, cuts time 53%

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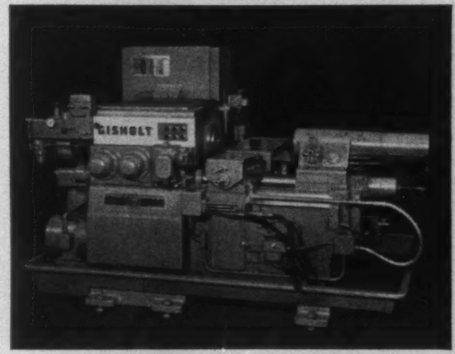
Change-over for different sizes averages less than 30 minutes. One 30° adjustable cam handles all tapers. Quick-disconnect fittings are easily reversed for tool relief when changing from inner to outer discs.



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Delivery Estimates Still Dropping

Mills, battling to land sales, continue trimming time from shipping promises.

Latest check shows about a week's decline on delivery estimates for many products.

- Mill delivery estimates are still being compressed.

The latest IRON AGE report on shipping promises (see table, below) shows drops of one week for many sheet, strip, bar, plate, structural, pipe, and stainless products. All major markets except Pittsburgh are included in the cuts.

At East Coast mills, delivery estimates on bars, plates, and shapes have been cut about a week. Bars and buttweld pipe are the products affected at Cleveland. In Detroit, time was trimmed from shipping estimates on sheet, strip, cold-finished bars, structurals, and flat-rolled stainless.

Minimum — Or Else — Chicago area mills are quoting faster delivery on cold-rolled strip, cold-finished bars, pipe products and structurals. In the Far West, hot-rolled bars, light plate, and structurals are available in shorter time.

Steelmakers claim that the estimates are sometimes drawn too fine. The claim is that buyers can't get the minimum delivery unless they "hit" a mill rolling or fill in a schedule gap.

But, whenever possible, the mills are meeting the lower end of shipping estimates — or losing orders. Even out-of-the-area mills can often ship in at times equaling those of local producers.

Sheet and Strip—Mill delivery estimates are still being pared. Some sheet tonnages for automakers, construction equipment makers, and farm machine manufacturers have moved back from December to January.

Mill sales officials on the **East Coast** and at **Pittsburgh** are not optimistic about a pickup in December or in the first quarter. Customers are still practicing short-term ordering. At **Cleveland,** a few first quarter orders are in for cold-rolled sheet. But the trend is largely limited to small companies making stampings, office furniture, and partitions. Service centers report flat-rolled orders are dragging.

Plates and Shapes—A major **East Coast** mill is quoting all types of plate (strip mill, sheared, and universal) for delivery in 10 days to three weeks. Shapes are available in 1-4 weeks. At **Pittsburgh,** ordering is still tight. Mills say November orders for structurals are up a little from October. Plate orders are down a little.

Structural mills in the **Chicago** area are operating about 14 turns a week or less. Plate demand is at low ebb.

Stainless—Deliveries are quoted from stock up to four weeks. On flat-rolled products, customers are usually getting immediate delivery out of stock. Mills don't expect much lift in the market before the first quarter.

Detroit producers say the new bright annealed stainless is moving very well. Interest is strong from automakers and fabricators using it for trim applications. (See IA, Nov. 3, p. 51.)

Service Centers—Sales showed no large gains during November. Orders for sheet and strip are slow. Only spotty upsurges for bar are reported. Plate is not moving. With construction slowing down seasonally, sales for light angles, light structurals, and fabricated rebar, are tapering off. Many warehouses, because of the sales slowdown, are allowing inventories to drift downward. A decline of about 5 pct is expected in December business.

Wire and Rod—Mills are fighting hard to make sales. **Midwest** markets report price cutting and freight absorption are very frequent in all wire and rod grades. Merchant wire is finished seasonally.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	2–5 wks	2–4 wks	3–5 wks	2–5 wks	1–3 wks	4–5 wks
HR Carbon Sheet	2–4 wks	2–4 wks	1–3 wks	2–3 wks	1–2 wks	4 wks
CR Carbon Strip	2–5 wks	3–5 wks	3–5 wks	2–5 wks	1–2 wks	4 wks
HR Carbon Strip	2–4 wks	2–4 wks	1–3 wks	2–3 wks	1–2 wks	4 wks
HR Carbon Bars	1–4 wks	1–3 wks	1–4 wks	Stock–4 wks	Stock–3 wks	2–3 wks
CF Carbon Bars	1–4 wks	1–3 wks	Stock–4 wks	Stock–5 wks	Stock–3 wks	1–2 wks
Heavy Plate	1–3 wks	1–2 wks			1–2 wks	4 wks
Light Plate	1–3 wks	1–2 wks	1–3 wks		1–2 wks	3 wks
Merchant Wire	Stock	Stock	Stock		Stock	2 wks
Oil Country Goods	Stock	Stock	Stock		Stock	
Linepipe	Stock	1–4 wks	Stock		Stock–2 wks	4 wks
Buttweld Pipe	Stock	Stock	Stock	Stock	Stock	Stock
Std. Structurals	1–4 wks	1–2 wks	1–4 wks	1–4 wks	Stock–2 wks	Stock
CR Stainless Sheet	Stock–4 wks	Stock–3 wks	1–4 wks	Stock		
CR Stainless Strip	Stock–4 wks	Stock–3 wks	1–4 wks	Stock		

COMPARISON OF PRICES

(Effective Nov. 21, 1960)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Nov. 21 1960	Nov. 15 1960	Oct. 18 1960	Nov. 23 1959
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plate (1.50 lb.) cokes	$10.65	$10.65	10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchants bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	45.00
Wrought iron bars	14.90	14.90	14.90	14.90
Wires: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 100 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire Rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Nov. 21 1960	Nov. 15 1960	Oct. 18 1960	Nov. 23 1959
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.11	$70.11	$70.57	$70.57
Foundry, South Cin'ti	71.92	71.92	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	69.61	69.61	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb.‡	11.00	11.00	11.00	12.25
Pig Iron Composite: (per gross ton)				
Pig iron	$66.32	$66.32	$66.41	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$26.50	$26.50	$28.50	$45.50
No. 1 steel, Phila. area	33.00	33.00	33.50	44.50
No. 1 steel, Chicago	25.50	25.50	26.50	42.50
No. 1 bundles, Detroit	21.50	21.50	25.50	44.50
Low phos., Youngstown	28.50	28.50	29.50	51.50
No. 1 mach'y cast, Pittsburgh	45.50	45.50	45.50	55.50
No. 1 mach'y cast, Phila.	47.50	47.50	49.50	54.50
No. 1 mach'y cast, Chicago	41.50	41.50	41.50	63.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$28.33	$28.33	$29.50	$44.17
No. 2 bundles	18.50	18.50	20.17	30.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.50-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	30.00	30.00	33.00	30-33
Copper, Lake, Conn.	30.00	30.00	33.00	33.00
Tin, Straits, N. Y.	103.25†	103.625	103.125	100.75
Zinc, East St. Louis	13.00	13.00	13.00	12.50
Lead, St. Louis	11.80	11.80	11.80	12.80
Aluminum, ingot	26.00	26.00	26.00	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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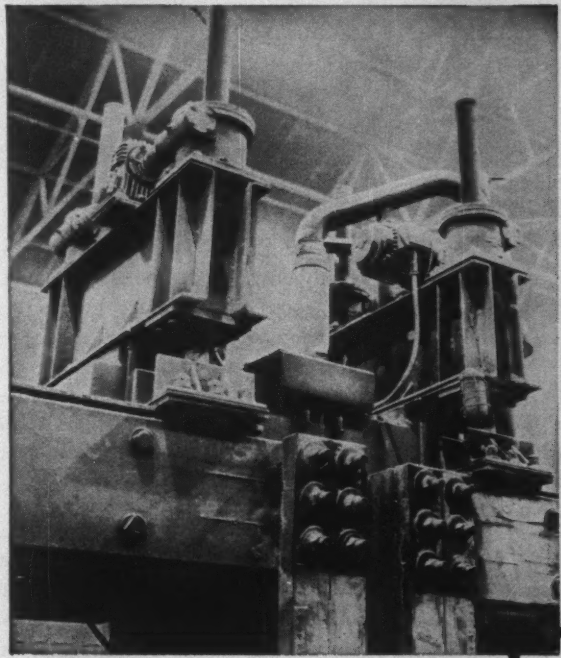
* Appears in the Nov. 17 - Dec. 1 issues.



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Market Starts To Level Off

Though some areas could still register lower prices, the market generally appears to be leveling off.

Cleveland and Cincinnati markets are more depressed this week. Elsewhere, the story is unchanged.

▪ Though threats of lower prices still linger in some areas, the scrap market is generally leveling off.

The markets in Cleveland and Cincinnati are even more depressed. But elsewhere prices are holding. Reports from St. Louis and Buffalo, though not representative of the entire market, indicate the bottom has been reached there. Nevertheless, demand is still missing.

Dealers are still selling small tonnage to meet expenses and remain on the list of active suppliers. But most aren't pushing to make large commitments at present price levels.

Exports continue to sustain the markets in New York and Philadelphia.

The IRON AGE composite price for No. 1 heavy melting scrap remains unchanged at $28.33. The composite price for No. 2 bundles is still $18.50.

Pittsburgh — Prices of most grades show no change as the market is in its mid-month lull. Dealers are not fighting the price of $21 on an old order of No. 2 bundles Neither are they pushing to make large commitments at this level. Low phos is being sold in small quantities at prices that range from $32 to $37, depending on quality and destination. There is talk of new sales and mills have indicated they are interested in scrap at present prices.

Chicago—Again this week, prices appear to be holding in a listless market. An expected drop of $1 in industrial and railroad lists couldn't be confirmed. Lower mill offering prices have been offset by spot broker orders as they filled existing orders at current price levels.

Philadelphia—An area foundry purchased cast grades at a slightly lower price this week. Many dealers say demand is definitely lacking and domestic sales are very small. The general atmosphere is one of sluggishness with very little change. Export continues to sustain this weakening market.

New York—The market is generally unchanged. Enough steelmaking scrap and foundry grades are moving overseas to hold prices at current levels. Major dealers report blast furnace grades continue at a complete standstill. Some dealers have written off any chance of domestic business for steelmaking scrap before 1961.

Detroit—The feeling is that the market will remain fairly steady at current prices through the rest of the month. There has been no change in the lists or in the willingness of mills to buy tonnage. Brokers indicate that calls from dealers are declining, perhaps because of the low state of prevailing prices.

Cleveland—The shutdown of additional furnaces in the area has depressed the market even more. Dealers now have difficulty moving individual cars. One mill taking scheduled shipments slowly has had to hold up over-eager dealers. In view of the new weakening, an additional drop in auto lists next week is probable.

Cincinnati—Dealers are grudgingly selling small lots of scrap to brokers at present prices in order to stay on the active list of suppliers. The market tone is continued weaker as dealers await area buying programs for December.

St. Louis—A sluggish, dull scrap market prevails. Prices are unchanged. The general feeling is that the bottom has been reached. However, no upturn is expected in the near future. Things are expected to drift along in the same listless state for the rest of the year.

Birmingham — Scrap movement is confined almost exclusively to electric furnace grades. Brokers report all early month orders have been filled, despite much dealer resistance to prices.

Buffalo—Prices remain unchanged and there is a feeling that they may have hit bottom. Generally, the market continues weak.

Boston—Although there was a little pickup in exports this week, the domestic activity has not been affected. There are still no sales at home and no price changes.

West Coast—Prices remain the same in Los Angeles, San Francisco, and Seattle. Major mills are virtually out of the market and exporting to Japan has quieted down.

Houston — The market is very quiet with the district mill staying out. Foundries aren't showing much interest so cast grades are idle. Export is tapering off and will probably be quiet into December.

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SCRAP PRICES *(Effective Nov. 21, 1960)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	22.00 to 23.00
No. 1 dealer bundles	27.00 to 28.00
No. 1 factory bundles	31.00 to 32.00
No. 2 bundles	20.00 to 21.00
No. 1 busheling	26.00 to 27.00
Machine shop turn.	11.00 to 12.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Low phos. punch'gs plate	32.00 to 33.00
Heavy turnings	23.00 to 24.00
No. 1 RR hvy. melting	31.00 to 32.00
Scrap rails, random lgth.	40.00 to 41.00
Rails 2 ft. and under	45.00 to 46.00
RR specialties	36.00 to 37.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	175.00 to 180.00
18-8 turnings	95.00 to 100.00
430 bundles and solids	85.00 to 90.00
410 turnings	60.00 to 65.00

Chicago

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 dealer bundles	25.00 to 26.00
No. 1 factory bundles	29.00 to 30.00
No. 2 bundles	16.00 to 17.00
No. 1 busheling	25.00 to 26.00
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn	12.00 to 13.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	12.00 to 13.00
Low phos. forge crops	37.00 to 38.00
Low phos. punch'gs plate, ¼ in. and heavier	33.00 to 34.00
Low phos. 2 ft. and under	31.00 to 32.00
No. 1 RR hvy. melting	29.00 to 30.00
Scrap, rails, random lgth.	37.00 to 38.00
Rerolling rails	48.00 to 49.00
Rails 2 ft. and under	41.00 to 42.00
Angles and splice bars	38.00 to 39.00
RR steel car axles	46.00 to 47.00
RR couplers and knuckles	35.00 to 36.00
No. 1 machinery cast.	41.00 to 42.00
Cupola cast.	36.00 to 37.00
Cast iron wheel	27.00 to 28.00
Malleable	40.00 to 41.00
Stove plate	30.00 to 31.00
Steel car wheels	35.00 to 36.00
Stainless	
18-8 bundles and solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	75.00 to 80.00
430 turnings	40.00 to 45.00

Philadelphia Area

No. 1 hvy. melting	$32.00 to $34.00
No. 2 hvy. melting	27.00 to 28.00
No. 1 dealer bundles	33.00 to 35.00
No. 2 bundles	18.00 to 19.00
No. 1 busheling	33.00 to 34.00
Machine shop turn.	12.00 to 13.00
Mixed bor. short turn.	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	18.00 to 19.00
Clean cast, chem. borings	23.00 to 24.00
Low phos. 5 ft and under	35.00 to 36.00
Low phos. 2 ft punch'gs	38.00 to 39.00
Elec. furnace bundles	34.00 to 35.00
Heavy turnings	25.00 to 26.00
RR specialties	36.00 to 37.00
Rails, 18 in. and under	47.00 to 49.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	36.00 to 37.00
Cast iron car wheels	37.00 to 38.00
Malleable	45.00 to 46.00
No. 1 machinery cast.	47.00 to 48.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$22.50 to $23.50
No. 2 hvy. melting	19.50 to 20.50
No. 1 dealer bundles	23.50 to 24.50
No. 2 bundles	15.00 to 16.00
Machine shop turn.	8.00 to 9.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Low phos. 18 in. and under	31.00 to 32.00
Rails, random length	36.00 to 37.00
Rails, 18 in. and under	42.00 to 43.00
No. 1 cupola cast	35.00 to 36.00
Hvy. breakable cast.	28.00 to 29.00
Drop broken cast.	43.00 to 44.00

Youngstown

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	21.50 to 22.50
No. 1 dealer bundles	26.00 to 27.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	13.00 to 14.00
Shoveling turnings	16.00 to 17.00
Low phos. plate	28.00 to 29.00

Cleveland

No. 1 hvy. melting	$23.50 to $24.50
No. 2 hvy. melting	17.50 to 18.50
No. 1 dealer bundles	23.50 to 24.50
No. 1 factory bundles	27.00 to 28.00
No. 2 bundles	16.50 to 17.50
No. 1 busheling	23.50 to 24.50
Machine shop turn.	10.00 to 11.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Cut structural & plates, 2 ft. & under	29.00 to 30.00
Low phos, punch'gs plate	24.50 to 25.50
Drop forge flashings	23.50 to 24.50
Foundry steel, 2 ft. & under	25.00 to 26.00
No. 1 RR hvy. melting	27.00 to 28.00
Rails 2 ft. and under	44.00 to 45.00
Rails 18 in. and under	45.00 to 46.00
Steel axle turnings	20.00 to 21.00
Railroad cast.	41.00 to 42.00
No. 1 machinery cast.	41.00 to 42.00
Stove plate	36.00 to 37.00
Malleable	43.00 to 44.00
Stainless	
18-8 bundles	175.00 to 180.00
18-8 turnings	70.00 to 75.00
430 bundles	75.00 to 80.00

Buffalo

No. 1 hvy. melting	$23.00 to $24.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 busheling	23.00 to 24.00
No. 1 dealer bundles	23.00 to 24.00
No. 2 bundles	17.00 to 18.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	11.00 to 12.00
Low phos. plate	31.00 to 32.00
Structurals and plate, 2 ft. and under	33.00 to 34.00
Scrap rails, random lgth.	32.00 to 33.00
Rails 2 ft. and under	42.00 to 43.00
No. 1 machinery cast.	42.00 to 43.00
No. 1 cupola cast.	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$27.00 to $28.00
No. 2 hvy. melting	25.00 to 26.00
Foundry steel, 2 ft.	27.00 to 28.00
No. 1 dealer bundles	28.00 to 29.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	8.00 to 9.00
Cast iron borings	16.00 to 17.00
No. 1 RR hvy. melting	28.00 to 29.00
Rails, random lengths	35.00 to 36.00
Rails, 18 in. and under	37.00 to 38.00
RR specialties	34.00 to 35.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	31.00 to 32.00
Stove plate	34.00 to 35.00
Cast iron car wheels	33.00 to 34.00
Rerolling rails	44.00 to 45.00
Unstripped motor blocks	33.00 to 34.00

Birmingham

No. 1 hvy. melting	$29.00 to $30.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 dealer bundles	29.00 to 30.00
No. 2 bundles	19.00 to 20.00
No. 1 busheling	29.00 to 30.00
Machine shop turn.	16.00 to 17.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	9.00 to 10.00
Electric furnace bundles	29.00 to 30.00
Elec. furnace, 3 ft. & under	32.00 to 33.00
Bar crops and plate	37.00 to 38.00
Structural and plate, 2 ft.	36.00 to 37.00
No. 1 RR hvy. melting	32.00 to 33.00
Scrap rail, random lgth.	36.00 to 37.00
Rails, 18 in. and under	43.00 to 44.00
Angles and splice bars	37.00 to 38.00
No. 1 cupola cast.	45.00 to 46.00
Stove plate	45.00 to 46.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	32.00 to 33.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$26.00 to $27.00
No. 2 hvy. melting	19.00 to 20.00
No. 2 dealer bundles	14.00 to 15.00
Machine shop turnings	5.00 to 6.00
Mixed bor. and turn.	7.00 to 8.00
Shoveling turnings	9.00 to 10.00
Clean cast. chem. borings	17.00 to 18.00
No. 1 machinery cast.	36.00 to 37.00
Mixed yard cast.	32.00 to 33.00
Heavy breakabe cast.	30.00 to 31.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	70.00 to 75.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$18.00 to $19.00
No. 2 hvy. melting	15.00 to 16.00
No. 1 dealer bundles	21.00 to 22.00
No. 2 bundles	14.00 to 15.00
No. 1 busheling	18.00 to 19.00
Drop forge flashings	18.00 to 19.00
Machine shop turn.	6.00 to 7.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	9.00 to 10.00
Cast iron borings	9.00 to 10.00
Heavy breakable cast.	23.00 to 24.00
Mixed cupola cast.	29.00 to 30.00
Automotive cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	145.00 to 150.00
18-8 turnings	45.00 to 50.00
430 bundles and solids	50.00 to 55.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$22.00 to $23.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 dealer bundles	22.00 to 23.00
No. 2 bundles	12.00 to 13.00
No. 1 busheling	22.00 to 23.00
Machine shop turn.	3.50 to 4.50
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings	11.00 to 12.00
No. 1 machinery cast.	37.00 to 38.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	25.50 to 26.50

San Francisco

No. 1 hvy melting	.... $32.00
No. 2 hvy. melting	.... 29.00
No. 1 dealer bundles	$27.00 to 28.00
No. 2 bundles	.... 18.00
Machine shop turn.	.... 14.00
Cast iron borings	.... 45.00
No. 1 cupola cast.	46.00 to 48.00

Los Angeles

No. 1 hvy. melting	.... $29.00
No. 2 hvy. melting	.... 26.00
No. 1 dealer bundles	.... 24.00
No. 2 bundles	.... 17.00
Machine shop turn.	.... 12.00
Shoveling turnings	.... 13.00
Cast iron borings	.... 13.00
Elec. furnace 1 ft. and under (foundry)	.... 40.00
No. 1 cupola cast.	.... 38.00

Seattle

No. 1 hvy. melting	.... $33.00
No. 2 hvy. melting	.... 31.00
No. 2 bundles	.... 21.00
No. 1 cupola cast	.... 36.00
Mixed yard cast.	.... 31.00

Hamilton, Ont.

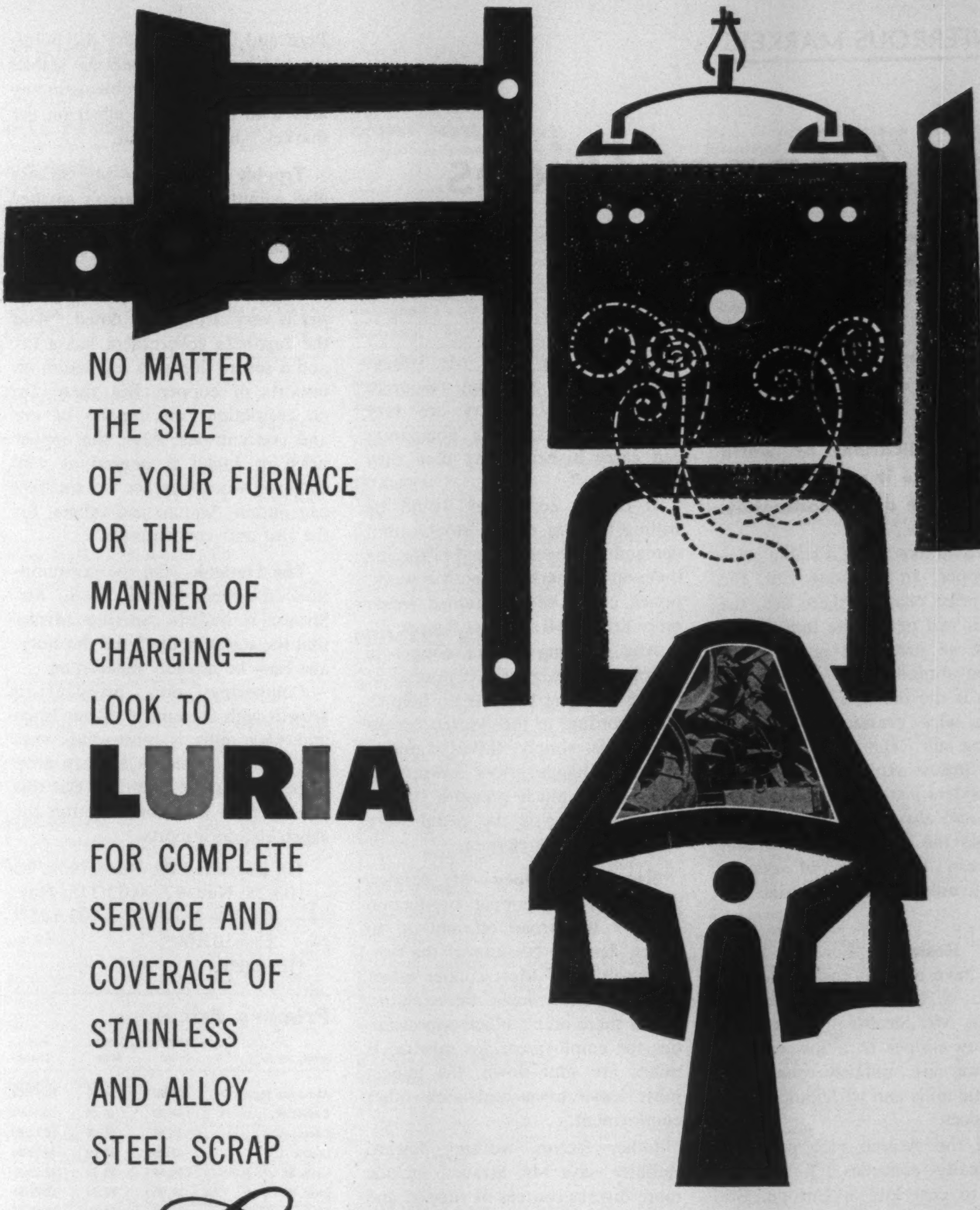
Brokers buying prices per net ton on cars:

No. 1 hvy. melting	.... $25.80
No. 2 hvy. melting cut 3 ft. and under	.... 22.50
No. 1 dealer bundles	.... 25.80
No. 2 bundles	.... 19.00
Mixed steel scrap	.... 16.00
Bush., new fact, prep'd.	.... 25.50
Bush., new fact, unprep'd.	.... 20.45
Machine shop turn.	.... 10.00
Short steel turn.	.... 12.00
Mixed bor. and turn.	.... 12.00
Cast scrap	.... 33.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	.... $32.00
No. 2 hvy. melting	.... 29.00
No. 2 bundles	.... 20.50
Machine shop turn.	.... 8.00
Shoveling turnings	.... 11.00
Cut structural plate 2 ft. & under	$40.00 to 41.00
Unstripped motor blocks	26.00 to 27.00
Cupola cast	33.00 to 34.00
Heavy breakable cast.	25.00 to 26.00



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Can Copper Prices Be Stabilized?

An industry spokesman says stabilization of prices would be a good thing for copper.

But complications of world markets make it a difficult task. But it can be done, moderately.

▪ "I would like to see a stable price for copper. In the long run, the fewer price changes there are, the better it will be for the industry.

"But we just can't ignore price changes abroad."

This is the position of Simon D. Strauss, vice president, American Smelting and Refining Co.

Mr. Strauss explains further what he considers justification for a price move, and also what it would take to avoid the price fluctuation that has been the mark of copper through most of its industrial history.

The Reasons—"Foreign fabricators have a wage cost advantage over U. S. brass and wire mills," explains Mr. Strauss. "If they can also buy copper at a lower price, then we are unfairly penalizing domestic mills and we should adjust our prices."

And the Asarco vice president realistically concedes, "Copper is likely to cost less in Europe. But such things as a 1.7¢ duty on copper coming into the U. S., freight, insurance, and handling tend to temper this. About 2¢ to 3¢ is the normal trading difference.

"Whenever prices in Europe drop below this for more than just a few days, we must adjust our prices," he believes.

Can Be Done—But there is a way to stabilize prices, Mr. Strauss believes. "The financial resources of the copper industry are very good," he says. "The companies can carry higher stocks than they have today."

If copper companies would be willing to hold unsold stocks until demand improves, instead of forcing them on the market when it is weak, prices could be maintained much more firmly, Mr. Strauss figures.

And shipping surplus copper to Europe (at lower prices) instead of selling it in the U. S. is no help at all, according to the Asarco executive. This simply drives London Metal Exchange prices down, putting just as much pressure on the U. S. price as if the metal were for sale here, he explains.

Keep Mines Open—Mr. Strauss points out that copper production can not be turned off and on to match demand because of the "social problems." Most copper mines are in isolated areas, he explains, where there aren't other opportunities for employment for miners. If mines are shut down, the miners must leave town and seek other employment.

Other factors working toward stability, says Mr. Strauss, include more diverse sources of supply, and more sophisticated buyers.

Supply Sources—In 1955 there were five major sources of supply, he explains: U. S., Chile, Canada, Northern Rhodesia, and Belgian Congo. At least three of these had serious labor problems which drastically reduced supply and pushed prices to 46¢ and 50¢ per lb.

"With more copper coming from Peru and Canada, where the political and business climate are stable, and Australia, local problems in any area tend to have less effect on the market," he points out.

Trouble at Tacoma—Mr. Strauss also admitted that Asarco's smelter in Tacoma, Wash., was having trouble buying enough ore and concentrates.

"The Japanese demand for copper is very strong," he noted. "And the Japanese government has a tax and a severe licensing regulation on imports of copper. But there are no restrictions on imports of ore and concentrates. Also, the copper price in Japan is pegged at well over the world market, so smelters can outbid Asarco, and others, for the ore and concentrates."

The Outlook—On the consumption of copper in the U. S., Mr. Strauss is bullish. And he advises that the statistics don't tell the story, and may be actually misleading.

Comparing our population growth with the output of our brass and wire mills is misleading, says Mr. Strauss. It shows a sharp drop in per capita consumption. But this doesn't take into consideration the sharp rise in imports.

Tin prices for the week: Nov. 16—103.25; Nov. 17—103.375; Nov. 18—103.25; Nov. 21—103.125*; Nov. 22—103.00*.

*Estimate.

Primary Prices

(cents per lb)	current price	last price	date o change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	30.00	33.00	10/11/60
Copper (CS)	30.00	31.00	10/13/60
Copper (L)	30.00	33.00	10/13/60
Lead, St. L.	11.80	12.30	12/21/59
Lead, N. Y.	12.00	12.50	12/21/59
Magnesium Ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/8/58
Titanium sponge	150–160	162–182	8/1/59
Zinc, E. St. L.	13.00	12.50	1/8/60
Zinc, N. Y.	13.50	13.00	1/8/60

ALUMINUM: 99% Ingot **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig Velasco, Tex. **NICKEL:** Port Colborne, Canada. **ZINC:** prime western. **TIN:** See above; Other primary prices, pg. 129.

NONFERROUS PRICES

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.038	.048-.061	.077-.096	.136-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	49.2
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand, Grade	......	67.9	69.0	77.9	103.1
AZ31B Spec.	......	93.3	96.9	108.7	171.3
Tread Plate	......	70.6	71.7	......	......
Tooling Plate	73.0	......	......	......	......

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)	37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting)	40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	138	120	138
Strip, CR	124	108	138
Rod, bar, HR	107	89	109
Angles, HR	107	89	109
Plates, HR	130	110	126
Seamless tube	157	129	200
Shot, blocks	...	87	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	55.13	....	52.36	56.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	51.75	52.04	51.69	55.81
Brass, Red	52.62	52.91	52.56	56.68
Brass, Naval	54.08	60.39	47.89	58.24
Munts Metal	52.14	....	47.45	....
Comm. Bz.	54.03	54.32	53.97	57.84
Mang. Bz.	57.82	....	51.42	....
Phos. Bz. 5%	75.70	75.70	76.20	77.63

Free Cutting Brass Rod 34.88

TITANIUM

(Base Prices f.o.b. mill)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17.00. Plate, HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged, commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.	29.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be	$65.00
Beryllium copper, per lb conta'd Be	$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading	$70.00
Bismuth, ton lots	$ 2.25
Cadmium, del'd	$ 1.50
Calcium, 99.9% small lots	$ 4.55
Chromium, 99.8% metallic base	$ 1.31
Cobalt, 97-99% (per lb)	$1.50 to $1.57
Germanium, per gm, f.o.b. Miami, Okla., refined	$29.95 to $36.95
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$75 to $85
Lithium, 98%	$9.00 to $12.00
Magnesium sticks, 10,000 lb.	57.00
Mercury, dollars per 76-lb flask f.o.b. New York	$208 to $210
Nickel oxide sinter at Buffalo, N. Y., or other U. S. points of entry, contained nickel	69.60
Palladium, dollars per troy oz.	$24 to $26
Platinum, dollars per troy oz.	$82 to $85
Rhodium	$137 to $140
Silver ingots (¢ per troy oz.)	91.375
Thorium, per kg.	$43.00
Vanadium	$ 3.65
Zirconium sponge	$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115	28.25
No. 120	27.25
No. 123	26.25
80-10-10 ingot	
No. 305	32.75
No. 315	30.50
88-10-2 ingot	
No. 210	40.50
No. 215	37.25
No. 245	32.50
Yellow ingot	
No. 405	23.50
Manganese bronze	
No. 421	27.50

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.	24.25-24.50
0.60 copper max.	24.00-24.25
Piston alloys (No. 132 type)	26.00-27.00
No. 12 alum. (No. 2 grade)	22.75-23.25
108 alloy	23.25-23.75
195 alloy	25.75-26.75
13 alloy (0.60 copper max.)	24.00-24.25
AXS-679 (1 pct zinc)	23.00-24.00

(Effective Nov. 21, 1960)

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½%	23.75-24.75
Grade 2—92-95%	22.50-23.50
Grade 3—90-92%	21.50-22.50
Grade 4—85-90%	21.00-22.00

SCRAP METAL

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	20⅝	18⅝
Red brass	23¼	22½
Comm. bronze	24	23¼
Mang. bronze	19⅛	18⅝
Free cutting rod ends.	19⅝	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	25¼
No. 2 copper wire	23½
Light copper	21¼
*Refining brass	21½
Copper bearing material	20½

*Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	24¼
No. 2 copper wire	23¼
Light copper	20¾
No. 1 composition	20¼
No. 1 comp. turnings	19¾
Hvy. yellow brass solids	15
Brass pipe	14
Radiators	16
Aluminum	
Mixed old cast.	12 —12½
Mixed new clips	13½—14
Mixed turnings, dry	12½—13

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	21½—22
No. 2 copper wire	19½—20
Light copper	17½—18
Auto radiators (unsweated)	12½—12¾
No. 1 composition	16½—17
No. 1 composition turnings	15¼—15¾
Cocks and faucets	12¾—13¼
Clean heavy yellow brass	11¾—12¼
Brass pipe	13¼—13¾
New soft brass clippings	13½—13¾
No. 1 brass rod turnings	12½—12¾

Aluminum

Alum. pistons and struts	6½— 7
Aluminum crankcase	8½— 9
1100 (2s) aluminum clippings	10 —10½
Old sheet and utensils	8½— 9
Borings and turnings	4½— 5
Industrial castings	9 — 9½
2020 (24s) clippings	10 —10½

Zinc

New zinc clippings	7 — 7¼
Old zinc	4 — 4½
Zinc routings	3 — 3¼
Old die cast scrap	2 — 2¼

Nickel and Monel

Pure nickel clippings	52-54
Clean nickel turnings	40
Nickel anodes	52-54
Nickel rod ends	52-54
New Monel clippings	23-23.50
Clean Monel turnings	16.50-17
Old sheet Monel	22-23
Nickel silver clippings, mixed.	18
Nickel silver turnings, mixed.	15

Lead

Soft scrap lead	8 — 8¼
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	79 —80
No. 1 pewter	59 —60
Auto babbitt	43 —44
Mixed common babbitt	10¼—10¾
Solder joints	14½—15
Siphon tops	41
Small foundry type	9¾—10¼
Monotype	9¾—10¼
Lino. and stereotype	8¾— 9
Electrotype	7½— 7¾
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	2¼— 2¾
Electro dross	2¼— 2¾

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	**Bethlehem, Pa.**			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$104.50 *A2*	$126.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*		5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. **Worcester, Mass.**									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	**Alton, Ill.**								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.525 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,13*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5,J3*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*					5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh Midland Butler Aliquippa N. Castle McKeesport Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *J3, B4, M10* 7.525 *E3*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	**Fontana, Cal.**	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	**Atlanta, Ga.**					5.70 *A8*			5.10 *A8*					
	Fairfield, City, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras.

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STEEL PRICES

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		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled 18 ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 1.25-lb. base box	Electro** 0.25-lb. base box	Thin Tinplate (electro)
EAST	Buffalo, N. Y.	5.10 B3	6.275 B3				7.525 B3	9.275 B3		6.40 W6	† Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		Prices are for 0.50 lb. base box for 0.45 lb. deduct 15¢; for 0.55 lb. add 15¢; for 0.60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 A2	6.325 A2				7.575 A2						
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 B3			
	Fairless, Pa.	5.15 U1	6.325 U1				7.575 U1	9.325 U1			$10.50 U1	$9.20 U1	$6.35 U1
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 B3	6.275 B3	6.875 B3	6.775 B3		7.525 B3	9.275 B3	10.025 B3	6.50 B3	$10.40 B3	$9.10 B3	
	Worcester, Mass.									6.70 A5			
MIDDLE WEST	Alton, Ill.									6.60 L1	**Holloware Enameling** 29 ga.—7.85 U1 at Gary; Pittsburgh; J3 at Aliquippa; W5 at Yorkville; Y1 at Indiana Harbor; W5 at Wheeling; 7.95 G2 at Granite City.		
	Ashland, Ky.	5.10 A7		6.875 A7	6.775 A7		7.525 A7						
	Canton-Massillon, Dover, Ohio			6.875 R1, R3									
	Chicago, Joliet, Ill.	5.10 W8, A1					7.525 U1, W8			6.40 A5, R3,W8			
	Sterling, Ill.									6.50 N4, K2			
	Cleveland, Ohio	5.10 R3, J3	6.275 R3, J3	7.65 R3*	6.775 R3		7.525 R3, J3	9.275 R3, J3		6.40 A5			
	Detroit, Mich.	5.10 G3, M2	6.275 G3, M2				7.525 G3	9.275 G3					
	Newport, Ky.	5.10 A9	6.275 A9										
	Gary, Ind. Harbor, Indiana	5.10 U1, I3, Y1	6.275 U1, I3, Y1	6.875 U1, I3	6.775 U1; I3, Y1	7.225 U1	7.525 U1, Y1, I3	9.275 U1, Y1		6.40 Y1	$10.40 U1, Y1	$9.10 I3, U1, Y1	$6.25 U1
	Granite City, Ill.	5.20 G2	6.375 G2	6.975 G2								$9.20 G2	
	Kokomo, Ind.			6.975 C9						6.50 C9			
	Mansfield, Ohio	5.10 E2	6.275 E2			7.225 E2							
	Middletown, Ohio		6.275 A7	6.875 A7	6.775 A7	7.225 A7							
	Niles, Warren, Ohio Sharon, Pa.	5.10 R3, S1	6.275 R3	6.875 R3 7.65 R3*	6.775 S1	7.225 S1†† R3	7.525 R3, S1	9.275 R3				$9.10 R3	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport Pa.	5.10 U1, J3, P6	6.275 U1, J3, P6	6.875 U1, J3 7.50 E3*	6.775 U1		7.525 U1, J3	9.275 U1, J3	10.025 U1, J3	6.40 A5, J3, P6	$10.40 U1, J3	$9.10 U1, J3	$6.25 U1
	Portsmouth, Ohio	5.10 P7	6.275 P7							6.40 P7			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 W3, W5	6.275 W3, F3, W5	6.875 W3, W5 7.50 W3*		7.225 W3, W5	7.525 W3	9.275 W3			$10.40 W5, W3	$9.10 W5, W3	
	Youngstown, Ohio	5.10 U1, Y1	6.275 Y1		6.775 Y1		7.525 Y1	9.275 Y1		6.40 Y1			
WEST	Fontana, Cal.	5.825 K1	7.40 K1				8.25 K1	10.40 K1			$11.05 K1	$9.75 K1	
	Geneva, Utah	5.20 C7											
	Kansas City, Mo.									6.65 S2			
	Los Angeles, Torrance, Cal.									7.20 B2			
	Minnequa, Colo.									6.65 C6			
	San Francisco, Niles, Pittsburg, Cal.	5.80 C7	7.225 C7	7.625 C7						7.20 C7	$11.05 C7	$9.75 C7	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 T2, R3	6.275 T2, R3	6.875 T2, R3	6.775 T2					6.40 T2, R3	$10.50 T2	$9.20 T2	$6.35 T2
	Houston, Texas									6.65 S2			

* Electrogalvanized sheets.

(Effective Nov. 21, 1960)

†† 7.425 at Sharon; Niles is 7.225.

IRON AGE

STEEL PRICES

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		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3*	5.675 *R3,B3*	7.70 *B5*	6.725 *B3,R3*	9.025 *B3,B5*	8.30 *B3*	5.30 *B3*				8.00 *W6*
	Claymont, Del.							5.30 *P2*		7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Harrisburg, Pa.							5.30 *P2*	6.375 *P2*			
	Milton, Pa.	5.825 *M7*	5.825 *M7*									
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*	5.675 *B3*		6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.		5.675 *B3*									
	Fairless, Pa.	5.825 *U1*	5.825 *U1*		6.875 *U1*							
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.		5.675 *B3*					5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7,A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*	5.675 *U1,R3, N4,P13,W8* 5.875 *L1*	7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*	5.675 *R3*	7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*	5.675 *G3*	7.90 *P3* 7.85 *P8,B5* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*	5 675 *U1,I3, Y1*	7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, I1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.		5.775 *C9*									8.10 *C9*
	Sterling, Ill.	5.775 *N4*	5.775 *N4*				7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*	5.675 *U1,J3*	7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*	5.675 *U1,R3, Y1*	7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.425 *J5* 6.375 *K1*	6.425 *J5* 6.375 *K1*		7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*	6.375 *C7,B2*	9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*	6.125 *C6*					6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*	6.425 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*	6.375 *C7* 6.425 *B2*				9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*	6.425 *B2,A10*		7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga.	5.875 *A8*	5.25 *A8*									8.00 *A8*
	Fairfield City, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*	5.675 *T2,R3, C16*	8.25 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*	5.675 *S2*		6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher. (Effective Nov. 21, 1960) * Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angel Nail & Chaplet Co., Cleveland
A7	Armco Steel Corp., Middletown, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme-Newport Steel Co., Newport, Ky.
A10	Alaska Steel Mills, Inc., Seattle, Wash.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Steel Co., Pacific Coast Div.
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7	A. M. Byers, Pittsburgh
B8	Braeburn Alloy Steel Corp., Braeburn, Pa.
B9	Barry Universal Corp., Detroit, Mich.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia Geneva Steel Div., San Francisco
C8	Columbia Steel & Shafting Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperweld Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shafting Co., Readville, Mass.
C15	G. O. Carlson, Inc., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C18	Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
D1	Detroit Steel Corp., Detroit
D2	Driver, Wilbur B., Co., Newark, N. J.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherproof Nail Co., Evanston, Ill.
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire-Reeves Steel Corp., Mansfield, O.
E3	Enamel Products & Plating Co., McKeesport, Pa.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimons Steel Corp., Youngstown
F3	Follansbee Steel Corp., Follansbee, W. Va.
G2	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Greer Steel Co., Dover, O.
G5	Green River Steel Corp., Owenboro, Ky.
H1	Hanna Furnace Corp., Detroit
I2	Ingersoll Steel Div., New Castle, Ind.
I3	Inland Steel Co., Chicago, Ill.
I4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jessop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Calif.
K2	Keystone Steel & Wire Co., Peoria
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O.
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mfg. Co., Sharon, Pa.
M4	Mid States Steel & Wire Co., Crawfordsville, Ind.
M7	Milton Steel Products Div., Milton, Pa.
M8	Mill Strip Products Co., Evanston, Ill.
M9	Moltrup Steel Products Co., Beaver Falls, Pa.
M10	Mill Strip Products Co., of Pa., New Castle, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N6	Northwest Steel Rolling Mills, Seattle
N7	Newman Crosby Steel Co., Pawtucket, R. I.
N8	Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9	Nelson Steel & Wire Co.
O1	Oliver Iron & Steel Co., Pittsburgh
O2	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monessen, Pa.
P2	Phoenix Steel Corp., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit
P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden, N. J.
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
P15	Philadelphia Steel and Wire Corp.
R1	Reeves Steel & Mfg. Div., Dover, O.
R2	Reliance Div., Eaton Mfg. Co., Massillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebling Sons Co., John A., Trenton, N. J.
R5	Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6	Rodney Metals, Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Div. of Copperweld Steel Co.
S10	Seneca Steel Service, Buffalo
S11	Southern Electric Steel Co., Birmingham
S12	Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13	Seymour Mfg. Co., Seymour, Conn.
S14	Screw and Bolt Corp. of America, Pittsburgh, Pa.
T1	Tonawanda Iron Div., N. Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Strip Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O.
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3	Ulbrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Wallingford Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheatland Tube Co., Wheatland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago.
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities		Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	City Delivery‡ Charge	Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	......	......	......	......
Baltimore**	$.10	7.87	9.71	10.16	10.78	8.44	9.13	8.65	11.90	17.48	16.48	21.58	20.83
Birmingham**		8.46	10.20	10.69	9.45	8.41	8.47	8.26	13.14	16.76	16.76	......	......
Boston**	.10	9.84	10.68	11.87	12.26	9.72	10.26	9.87	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	8.80	9.95	11.40	11.15	8.80	9.30	8.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.72	10.35	10.30	10.89	8.56	9.06	8.70	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	8.89	10.41	10.35	11.21	8.94	9.62	9.02	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.72[1]	10.03	11.39	11.01	8.80	9.45	8.81	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19	......	......	......	20.84
Detroit**	.15	8.98	10.61	10.65	11.26	8.93	9.62	9.01	11.16	17.38	16.38	21.48	20.73
Houston**		9.22	9.65	12.19[3]	10.78	8.95	8.86	8.63	13.10	17.50	16.55	21.55	20.85
Kansas City**	.15	9.36	11.02	11.50	11.02	9.25	9.95	9.46	11.72	17.17	15.87	21.87	21.12
Los Angeles**		9.59[1]	11.29	12.20	11.29	9.70	10.45	9.55	14.20	18.30	17.35	22.90	22.20
Memphis**	.15	9.13	10.20	......	11.39	8.81	9.16	8.97	12.89	......	......	......	......
Milwaukee**	.15	8.86	10.49	10.44	11.03	8.70	9.28	8.84	11.04	17.24	16.24	21.24	20.59
New York	.10	9.46	10.23	11.45	11.56	9.61	10.30	9.84	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	......	......	8.90	8.65	9.20	8.90	10.70	......	......	......	......
Philadelphia**	.10	8.45	9.70	11.50	10.95	8.80	9.05	8.85	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	8.72	10.03	11.28	10.99	8.56	9.06	8.70	11.40	17.10	16.10	21.20	20.45
Portland**		9.45	11.30	12.35	11.45	9.60	10.80	9.45	16.65	18.60	17.80	22.70	22.20
San Francisco**	.10	10.27	11.79[2]	11.50	11.88	10.48	10.59	10.17	15.20	18.30	17.35	22.90	22.20
Seattle**		10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	10.51	11.57	12.50	11.95	10.10	10.65	9.94	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	8.92	10.75	10.68	11.09	8.77	9.29	8.92	11.43	17.48	16.48	21.58	20.83
St. Paul**	.15	8.99	9.84	10.99	11.16	8.83	9.33	8.97	11.64	......	16.69	......	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. ** These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Nov. 21, 1960)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	...	...
Birmingham *W9*	62.00	62.50*	66.50	...	...
Birmingham *U4*	62.00	62.50*	66.50	...	...
Buffalo *R3*	66.00	66.50	67.00	67.50	...
Buffalo *H1*	66.00	66.50	6..00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	...
Chester *P2*	68.00	68.50	69.00	...	...
Chicago *I4*	66.00	66.50	66.50	67.00	...
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	...
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	...	...	...
Geneva, Utah *C7*	66.00	66.50	...	...	...
Granite City *G2*	67.90	68.40	68.90	...	...
Hubbard *Y1*	...	...	66.50	...	...
Ironton, Utah *C7*	66.00	66.50	...	...	...
Lyles, Tenn. *T3*	...	...	...	...	73.00
Midland *C11*	66.00	...	...	...	...
Minnequa *C6*	68.00	68.50	69.00	...	...
Monessen *P6*	66.00	...	...	...	...
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	...	66.50	67.00	67.50	...
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	...	66.50	67.00	...
So. Chicago *R3*	66.00	66.50	66.50	67.00	...
So. Chicago *W8*	66.00	...	66.50	67.00	...
Swedeland *A2*	68.00	68.50	69.00	69.50	73.00†
Toledo *I4*	66-00	66.50	66.50	67.00	...
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	...	...	66.50	...	...

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, (Globe Div.), $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)	
Plain finish—packaged and bulk.	50
Hot galvanized and zinc plated—packaged	43.75
Hot galvanized and zinc plated—bulk	50

(On all the above categories add 25 pct for less than container quantities. Minimum plating charge—$10.00 per item. Add 7½ pct for nuts assembled to bolts)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Discount Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	29.50 32.75	33.25	29.50 34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	33.25	33.25	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5*.

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7*, Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13*, (25¢ per lb. higher); New Bedford, Mass., *R6* Gary, *U1*, (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8*; Ambridge, Pa., *B7*.

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1*.

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1*.

Forging billets: Ambridge, Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa , *C2*.

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

		Discount Hex	Discount Square
Full Cartons		46	57
Bulk			
¼ in. diam or smaller	25,000 pcs		
5/16 or ⅜ in. diam		56	60
	15,000 pcs		
		56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Nov. 21, 1960)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	...	...	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	...	...	...	...	...	9.00	9.55
Chicago *W7*	173	...	...	...	...	9.00	9.55†
Cleveland *A6*	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	9.00	...
Crawf'dav. *M4***	175	193	...	214	199	9.10	9.85
Donora, Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	...	...	...	...	...	...
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	184-1	197	...	219	203	9.10	9.775
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet, Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	...	...	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer,Mass *W6*	...	...	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	...	...	...	236	...	9.95	10.50
SparrowsPt. *B3***	175	...	...	215	198	9.10	9.775
Struthers, O. *Y1**	...	...	...	...	...	8.65	9.20
Worcester *A5*	179	...	...	...	...	9.30	9.85
Williamsport *S5*	...	...	...	...	...	...	...

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	......	......	......	......	......	......	......	......
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	......	......	......	......	......	......	......	......
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50	......	......	......	......	......	......	......	......
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	......	......	......	......	......	......	......	......
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	......	......	......	......	......	......	......	......
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	......	......	......	......	......	......	......	......
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	......	......	......	......	......	......	......	......
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	......	......	......	......	......	......	......	......
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50	......	......	......	......	......	......	......	......
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	......	......	......	......	......	......	......	......
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	......	......	......	......	......	......	......	......
Fontana *K1*	+6.25	......	+2.25	......	0.75	......	1.25	......	1.75	......	2.25	......	2.75	......	......	......	......	......	......	......	......	......
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	......	......	......	......	......	......	......	......
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	......	......	......	......	......	......	......	......
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	5.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50	......	......	......	......	......	......	......	......
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.00¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

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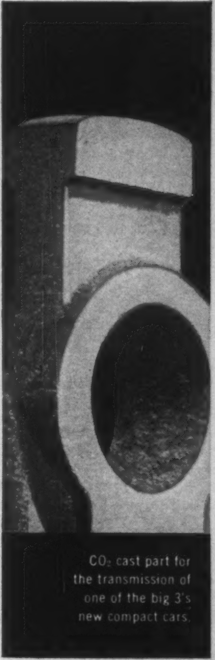

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SPECIALISTS IN STACK-, CO$_2$, AND SHELL-MOLD CASTING

FERROALLOY PRICES

Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 65-71% Cr, .30-1.00% max. Si.

0.02% C	41.00	0.50% C	33.25
0.05% C	34.00	1.00% C	33.00
0.10% C	33.75	1.50% C	32.75
0.20% C	33.50	2.00% C	32.50

3-5% C, 53-63% Cr, 2.5% max. Si	26.00
4-6% C, 58-63% Cr, 3-6% Si	22.50
5-8% C, 58-63% Cr, 3-6% Si	22.50
6-8% C, 50-56% Cr, 4-7% Si	22.00
4.00-4.50% C, 60-70% Cr, 1.2% Si	28.75
0.025% C (Simplex)	35.00
0.010% C max, 63-66% Cr, 5-7% Si	34.50
0.25% C max	33.50
0.010% C max, 68-71% Cr, 2% Si max	34.50
0.25% C max	33.50

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

Chromium Metal

Per lb chromium, contained, packed delivered, ton lots, 97.25% min. Cr, 1% max. Fe.

0.10% max. C	$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe	1.38

Electrolytic Chromium Metal

Per lb of metal 2" x D plate (⅛" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	$1.15
Ton lots	1.17
Less ton lots	1.19

Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in x down, packed.

Price is sum of contained Cr and contained Si.

	Cr	Si
Carloads, bulk	24.50	14.60
Ton lots	29.75	16.05
Less ton lots	31.35	17.70

Calcium-Silicon

Per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads, bulk	24.00
Ton lots	27.95
Less ton lots	29.45

Calcium-Maganese—Silicon

Cents per lb of alloy, lump, delivered, packed.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads, bulk	23.00
Ton lots	26.15
Less ton lots	27.15

SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	21.15
Less ton lots	22.40

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	18.45
Ton lots	19.95
Less ton lots	21.20

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload bulk	19.20
Ton lots to carload packed	21.15
Less ton lots	22.40

Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy. W. Va.; Sheffield, Ala.; Portland, Ore.	11.00
Houston, Tex.	11.00
Johnstown, Pa.	11.00
Lynchburg, Va.	11.00
Neville Island, Pa.	11.00
Sheridan, Pa.	11.00
Philo, Ohio	11.00
Rockwood, Tenn.	11.00
S. Duquesne	11.00

Add or substract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.70
Ton lots packed in bags	16.10

Spiegeleisen

Per gross ton, lump, f.o.b., 3% Si max.

Mn	Palmerton, Pa. 10 lb, pig	Palmerton, Pa. 35 lb, down	Neville Is., Pa. 35 lb
16-19%	$98.00	$96.00	$100.50
19-21%	100.00	98.00	102.50
21-23%	102.50	100.00	105.50

Manganese Metal

2 in. x down, cents per pound of metal delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads, bulk	34.25
Ton lots, palletized	36.25
250 to 1999 lb	39.00
Premium for Hydrogen - removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn	24.00

Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.

	Carloads (Bulk)	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	37.15	39.95	41.15
0.07% max. C	35.10	37.90	39.10
0.10% max. C	34.35	37.15	38.35
0.15% max. C	31.10	33.90	35.10
0.30% max. C	29.80	32.60	33.80
0.50% max. C	28.50	31.30	32.50
0.75% max. C, 80.85% Mn, 5.0-7.0% Si	27.00	29.80	31.00

Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.3¢ f.o.b. shipping point.

Carloads bulk	11.60
Ton lots, packed	13.25
Carloads, bulk, delivered, per lb of briquet	14.00
Briquets, packed pallets, 2000 lb up to carloads	16.40

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $106.50 gross ton, frieght allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.

	Ton lots,	Carloads,
98.25% Si, 0.50% Fe	22.95	21.65
98% Si, 1.0% Fe	21.95	20.65

Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.

Carloads, bulk	8.00
Ton lots, packed	10.80

Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	14.60	75% Si	16.90
65% Si	15.75	85% Si	18.60
90% Si	20.00		

Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.

Openhearth	3.20
Crucible	3.30
High speed steel	3.40

Calcium Metal

Eastern zone, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
100 to 1999 lb	2.40	3.30	4.55

(Effective Nov. 21, 1960)

Alsifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y. per lb.

Carloads, bulk	9.85¢
Ton lots	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo	$1.50

Ferrocolumbium, 58-62% Cb, 2 in. x D, del'd per lb con't Cb

Ton lots	$3.45
Less ton lots	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta	$3.40
Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo	$1.76

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $5.00 unitage,

per gross ton	$120.00
10 tons to less carload	$131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti	$1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots,

per lb contained Ti	$1.50
Less ton lots	$1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$255.00
Ferrotungsten, ¼ x down packed per pounds contained W, ton lots delivered	$2.15 (nominal)

Molybdic oxide, briquets per lb. contained Mo, f.o.b. Langeloth,

Pa.	$1.49
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.38

Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump	18.50¢
Ton lots, packed lump	20.50¢
Less ton lots	21.00¢

Vanadium oxide, 86-89% V_2O_5 per pound contained V_2O_5	$1.38

Zirconium silicon, per lb of alloy

35-40% del'd, carloads, bulk	26.25¢
12-15%, del'd lump, bulk-carloads	9.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload	$5.50

Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound	30¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b., Suspension Bridge, N. Y., freight allowed.

Ton lots per pound	18.25¢

Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots	$1.20

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No. 79	50¢

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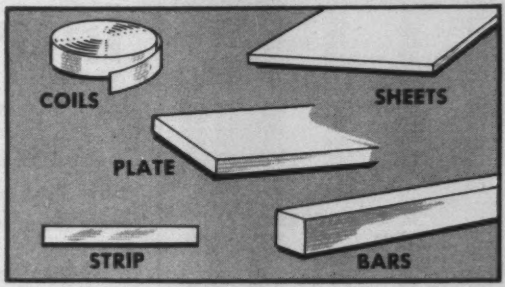

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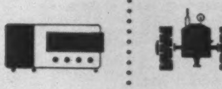

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1	1000	GE	900	260	4000/6600
1	1000	GE	900	600	2300/4160
1	500	GE	900	125/250	440
1	500(New)	GE	1200	300	2300
1	500	GE	900	250	2300/4160
1	350	GE	900	125	440/2300/4160
1	300	GE	1200	275	2300/4160
1	300	GE	1200	250	440/2300
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1	2200	GE	MCF	600	400/500
2	2000	GE	Enc. S.V.	350	230/350
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2	1500	Whse.	New	600	300/700
4	1500	Whse.	New	525	600
1	1300	GE	MCF	300	200/400
1	1200	GE	MCF	600	450/600
1	1000	Whse.		500	800/2000
4	1000	GM	D-8	600	600/900
2	900	GE	MCF	250	180/360
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1	750	GE	MCF	600	120/360
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Activity Is Down In New York

Used machinery dealers in New York say business has gone from bad to worse.

There are exceptions, but the majority of the dealers find the current situation far below the sales status of six months ago.

▪ For many used machinery dealers in the New York area business seems to be going from bad to worse.

There are many exceptions. But the majority report business is now somewhat worse than it was six months ago. And depressing the dealers even more is the slackening rate of inquiries.

"Inquiries are the barometer," says one dealer. "Our sales are consistently a definite percentage of inquiries. So until these pick up we can't expect any better business."

Dealers generally agree that they will wind up 1960 with less sales and less profits than last year. How much less varies widely. Some report only a slight sag, about 5 to 10 pct. But others say they will do 25 pct less business at best.

Better Since August—One of the exceptions has been doing progressively better since August. "You just can't wait for inquiries anymore," he says. "We used to send out lists of our equipment to prospects every three months or so. Now we are putting out feelers twice a week."

Export still isn't a major factor in this market. But from current indications it is liable to be soon. "There has been more export interest in this market in the last six months than in any time I can remember," comments one dealer.

"I've got a crane that is going to South America," says another. "And there is more demand from overseas than ever before."

There are reports indicating that much of the U. S. equipment in Brazil is surplus used machinery.

Brazil has regular imports of used machinery pegged under a very unfavorable exchange rate to discourage this. But under a clause called Instruction 113, a Brazilian company that can show that the machinery will be used to make something new and desirable under the government's plans for expanding the industrial base can avoid this regulation. Mr. Kann reports more and more companies are taking advantage of this.

Big Sellers—The strongest items moving in the New York market are presses of all types and sizes. "This smacks of auto production abroad," says one dealer.

The softest items are machine tools of all kinds. One of the reasons for this, says a dealer, is the sharp increase in liquidation by the government of tools it considers surplus.

Good Prices—"There has been an avalanche of auction sales," says another. "Users are getting what they want at these, and at pretty favorable prices."

As through most of this year, dealers say they just can't move anything that isn't post-Korean War and in good condition.

When will business start looking up? Not until spring at the earliest, is the general consensus.

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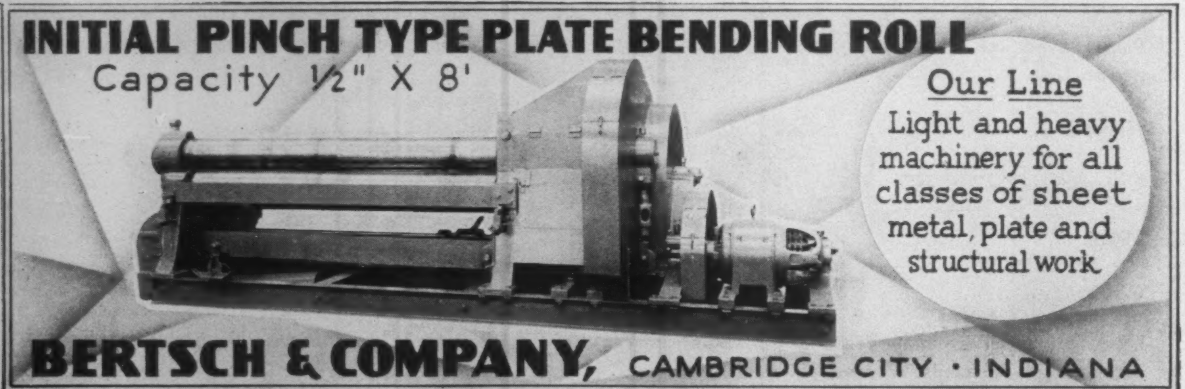

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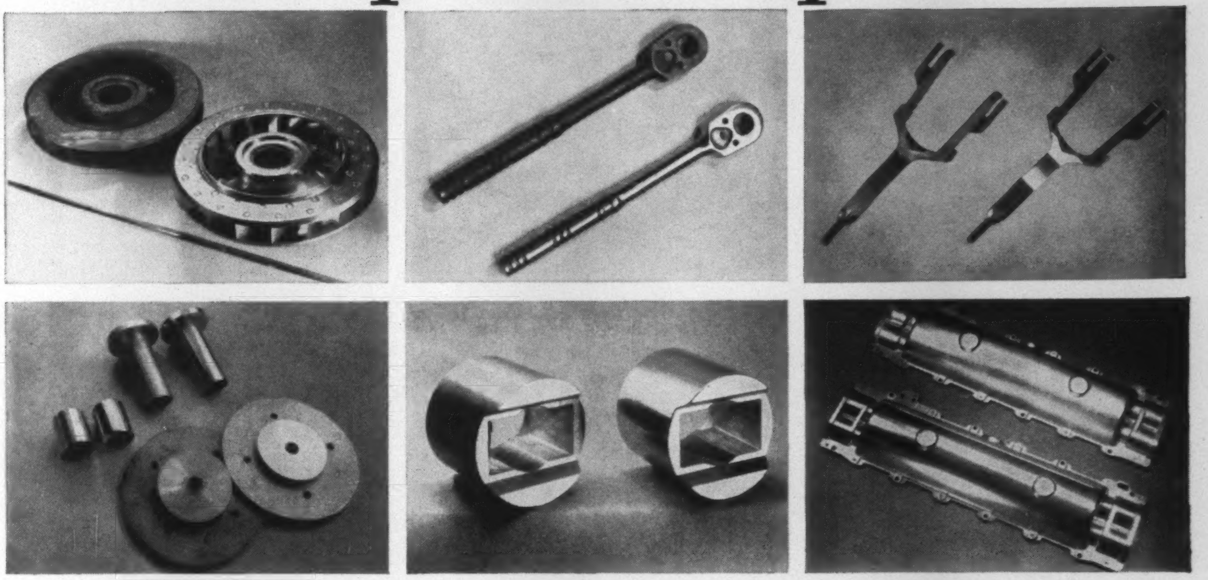

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